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MyData: A Service Concept for Personal Data Ownership

Miskeljin, Predrag

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Laurea University of Applied Sciences
Leppävaara

MyData:
A Service Concept for Personal Data Ownership

"*The future cannot be predicted, but futures can be invented.*"

Dennis Gabor
Nobel Prize winner in Physics for the work in holography
From his 1963 book "Inventing the Future"

Predrag Miskeljin
Degree Programme in Service
Innovation and Design
Master's Thesis
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Laurea University of Applied Sciences **Abstract**
Leppävaara
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Year 2018 Pages 116

The purpose of this thesis is to develop a concept of a service that enables individuals to own their personal data. The service is called MyData.

The report is structured according to the process undertaken to develop the MyData service concept. After the introduction, it presents the initial idea in the form of a preliminary concept, and continues with an extensive literature review and a modified preliminary concept. With these inputs, the empirical research method is constructed and the concept is further evolved. The findings from the research are presented and the final concept is outlined. In the conclusions, the research and its practical value are summarized and directions for further research are suggested.

The thesis contributes to literature and practice by constructing a unique combination of Value Proposition Design and Value Networks.

MyData is a bold attempt to ensure transition towards a desired future where individuals own their own data. The thesis claims that the adoption of the MyData service would lead to a sustainable, balanced, human-centered personal data ecosystem. In such an ecosystem, co-created value would be balanced with competing rights and risks for all the actors: individuals, organizations, and governments. This would release the enormous potential personal data has in serving humankind.

At the end, the call is made for opening the MyData concept for the public to attract capable, likeminded people, to take if forward towards trusted implementation and operation.

Key words, service innovation, service design, personal data ecosystem, MyData service concept

Laurea-ammattikorkeakoulu **Tiivistelmä**
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Finnish translation of the abstract begins here

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1 Introduction

1.1 Background

I recall the moment when the initial idea of MyData was born. In the autumn of 2013 in one of the contact sessions at Laurea, the lecturer mentioned that monetization of personal data was considered becoming a trend. Different kinds of personal data would be sold for money regardless of the purpose it would eventually end up being used for. Although I was aware of the growing practices of personal data mining, trading and monetization, I remember the strong feelings it provoked. The idea of supporting people to make business by selling personal data sounded very wrong and outdated. It was a time just after I published my first blog about Design Thinking where I wrote about what I believed the purpose of business should be. "Traditional purpose of business to make money focuses companies to maximize the short-term profits and delivers returns to shareholders. Great companies, however, believe that the business is inherent part of the society as they, being so powerful, effectively shape the lives of their employees, partners and consumers. In those companies, people and the society are not afterthoughts or inputs to be considered and discarded but the core to their purpose."

I wondered how people can be the core to the purpose of a business yet encouraged by that very same business to sell part of their identity, part of their own self. Consequently, the more data one can amass, the more he would be worth. All kinds of bizarre behaviors in creating more data in the race for profit came to mind. Internet is already full of fake personal data. People already often provide false information to get what they want. They do that because they fear their personal data would be misused, and they can get away with it because the Internet is built without an identity layer. Authenticity and quality of personal data would likely deteriorate even more. Keeping aside judgement about morality of monetization approach, I realized monetization was not even close to realizing potential value from personal data. And what if people would realize a clear purpose and feel safe to share their real personal data? There must be a way to get more real value out of real data. An idea started shaping and I started drawing on my notebook.

1.2 Existing problems and potential future problems

Technological breakthroughs, especially in digital technologies that are merging computers, communications and multimedia all connected via Internet, have revolutionized communications, distribution and accessibility of information. This is changing radically how people and companies interact, enabling innovations that are deeply transforming people's lives.
We are living in an interconnected world, where people, the physical and the digital world are all connected. By the end of this decade, most people on the planet are likely to be connected to each other through some sort of mobile device.

Growing connectivity is resulting in staggering explosion of data created and replicated worldwide. A study carried out by International Data Corporation (IDC 2014) claims that the number of bytes of digital data in 2013 was close to the number of stars in the physical universe – 4.4 zettabytes. Zettabyte (ZB) is equal to 1000 bytes on seventh power, or for example, one billion terabytes. The IDC study estimates that this number will grow ten times to 44 ZB by 2020, which is more than double each year. On the way to becoming data-driven, it is obvious that companies must face a vast, diverse, rapidly expanding digital universe, looking forward to turning the challenge into a source of opportunity. The key is to find a much more manageable area of richer, high-value data, estimated at 1.5% of total data (IDC 2014, 16). Yet, while drowning in data, companies are striving for insights (Hopkins 2015). Being data-driven, for the companies means better chances for success as it leads to increased productivity and profitability (McAfee 2012).

Two thirds of existing digital data are personal data, but 85% of it is in the custodianship of enterprises (WH 2014, 2). Personal data is any information that can be connected to an identified individual. Although the volume of information people create directly themselves is big, on average 700 pieces of personal information a day per individual (Hildebrandt 2013, 91), it pales in comparison to the amount of digital information created about them by the organizations each day.

Such fantastic growth of quantity and also quality of personal data carries great innovation potential and brings staggering opportunities for improving people's lives, boosting economic growth, and solving social challenges. Enabled by availability of personal data, development of innovative personalized products and services would explode, transforming the lives of individuals by fulfilling their personal needs and effectively enabling their dreams. Use of personal data would enable governments to better fulfill their functions and respond creatively and effectively to social and global challenges. Recognizing its potential, The World Economic Forum refers to personal data as a new asset class, comparing it to traded goods, gold or oil (WEF 2012, 7).

Yet, probably the greatest value creation opportunities coming from personal data still remain beyond comprehension. The reason is that personal data are not readily available. They are scattered across corporate and government databases. The flow of data is prevented by specific country laws, legal contracts, ownership disputes, and incompatible technology standards. These challenges are great but solvable, only if the proper way could be found to address the biggest challenge of them all - decline in trust among all the actors in the personal data ecosystem (PDE): individuals, organizations and government (WEF 2012, 5).

The evidence for the deterioration of trust is vast (WEF 2012, 5-12). Individuals do not know what data are collected about them, how the data are combined, shared, interpreted and used, and by whom. People struggle to define, manage and protect their online identity. Security breaches lead to people becoming victims of identity thefts and frauds. People fear of Big Brother's control and manipulation, no matter whether the data is held by governments or big companies. Targeted with unwanted offers and preprocessed information, realizing they are under constant surveillance, people see their privacy regularly breached. Currently, no real mechanisms are available to allow individuals to own and share their data. Organizations possess strong sense of ownership and control over the data they collect about individuals. Results of data analysis and insights are considered proprietary asset. Organizations are struggling with retaining quality and quantity of personal data, collecting missing pieces, ensuring security, and achieving proper return of investment. They are constantly concerned with what they can and cannot do with data, how their actions and changing public sentiment regarding data issues can affect their brands. Thanks to social media, the time between discovery of the incident and its widespread media coverage is measured in hours rather than days, shortening response time and prompting companies to repeatedly invest more in risk handling, prevention and compliance. Outdated and inadequate regulations make some organizations feel discriminated against others. Government demands towards companies to hand over personal data or install backdoors in their products lowers the trust individuals have towards governments and organizations. Organizations do not find individuals trustworthy enough to empower them with greater control of their data, fearing their unexpected reactions would negatively impact the brand or benefit the competition. Some recently appearing solutions for personal data control, like different attempts for monetization, do not always serve the best interests of individuals.

For personal data ecosystem to stabilize, benefits of data sharing should outweigh the risk of transparency (WEF 2011, 17). The question becomes how to set the rules and tools to enable the realization of the potential of personal data for value creation for all the actors in a trusted way. Many calls for action and suggestions have been made (Ctrl-Shift 2011; WEF 2011; WEF 2012; WEF 2014). For example, WEF study (2014, 4) suggests that the following

actions need to be taken in order to strengthen trust: ensure meaningful transparency by presenting relevant data and practices to individuals in an understandable form, empower individuals to use the data for their own purposes and have their say in how organizations are using their data, and strengthen accountability for all of the stakeholders.

Yet there is a deeper issue that needs to be recognized and acted upon. Chan (2014) suggests that despite existing technical connectivity and ability of companies to harness big data, there is still a fundamental disconnection between people and the companies that attempt to reach them through these technologies and understand them through data. He points out that companies need to connect with people at the human level to be able to deliver more relevant, timely, and contextual offer with the content that relates to the very core of people's being, their humanity. The biggest challenge for companies therefore is not how to be data driven or have the best leverage technologies in hand, but how to relate at human level and engage into deep and lasting relationship with people. Although this has always been an ultimate challenge of the business, call for action is becoming louder than ever (Chan 2014).

1.3 Purpose of the thesis

The purpose of this thesis is to develop a concept of a service that enables individuals to own their personal data. The introduction of such a service would lead to a balanced personal data ecosystem. The working name for the service is MyData1.

It is important to highlight that MyData service is an enabler, and as such, not sufficient to ensure that individuals would actually take ownership of their data. For that to happen, appropriate legislation needs to be in place and also participation of all actors of PDE in utilizing MyData service ensured. That is why the way to attract actors, specifically organizations, to start using the service in the transition towards full utilization of MyData has been a question of special concern during research.

The ownership of personal data is a complex legal and social construct, and a controversial topic that has stirred long and emotionally charged debates among stakeholders (WEF 2012, 16). Ownership is not an exclusive right given to one side or another. Instead, valid rights from other involved parties must be considered. Therefore, ownership involves both rights and responsibilities. In order to exercise those rights, owners may require different permissions from others. Ownership of personal data is a lot like an ownership of a house. When renting a house, the landlord has the right to enter his property, but not in a way it would violate their tenant's privacy. Therefore, he can exercise his right at an agreed-on time with permission from the tenant. The house owner cannot do whatever he wants with the house either. He needs to consider laws and municipal regulations, neighbors' rights, and the bank's rights that own the mortgage etc.

Probably the most important reason why the term 'ownership' is chosen over the term 'control' is that personal data is part of a person's identity. Although these discussions have been continuing for quite some time, it is not clear what identity means in a merging digital and real world. The ownership of personal data should be considered part of a wider concept – the ownership of one's own identity. From that perspective, MyData can be seen as a platform for establishing ownership of one's own identity.

Early literature research has contributed to repositioning the problem from 'personal data ownership' towards 'balancing of misbalanced PDE'. The realization that these problems are related and that MyData is offering a solution to both has resulted in focusing on the former

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[1] Open Knowledge Finland's My-Data working group has named their approach MyData Nordic Approach. Choosing the same name MyData is pure coincidence, as it happened before the author learned about the existence of the MyData Nordic Approach.

problem to drive much of the later research and evolution of MyData service concept. Balancing PDE is critical for extracting value from the enormous potential personal data has for fueling innovations that would lead to improving people lives, solving social issues, and busting economy. MyData is seen as a human-centered approach for balancing PDE.

The implementation of the concept is delimited beyond the scope of the thesis.

1.4 Structure of the report

The report is structured according to the actual process conducted to develop MyData service concept (Figure 1).

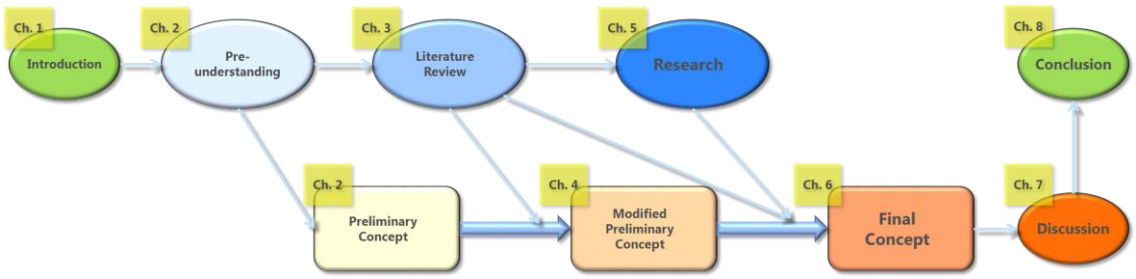

Figure 1: Structure of the report

Chapter 1 exposes the background, introduces the problem, and explains the purpose of the thesis.
Chapter 2 starts with describing the concept of pre-understanding and the sources of the researcher's pre-understanding. It then lays out the first preliminary version of the concept based on the pre-understanding.
Chapter 3 contains the literature review. It starts from the service dominant logic viewpoint, discusses wickedness of design problems, and focuses on the main topic of the thesis – personal data, covering its characteristics and potential, challenges in personal data ecosystem, and ongoing efforts.
Chapter 4 outlines the modified version of the preliminary concept based on the literature.
Chapter 5 describes the research method and how it was applied in practice.
Chapter 6 discusses findings and introduces the final concept of MyData service motivated by findings, results, and interpretations from the empirical research and literature. Comparison with the other prominent model, MyData Nordic, is given in the chapter 7.
Chapter 8 summarizes the work, discusses the value of the research, and suggests directions for future research and development.

2 Preliminary concept based on pre-understanding

2.1 Pre-understanding

Gummesson (2000) describes pre-understanding as the knowledge, insights, and experience people have before they engage in research or consultancy assignment. Understanding then refers to the new insights obtained through that research or assignment. Being an output from the previous task, understanding becomes pre-understanding for the next task as the research process advances.

It is important to highlight that the term pre-understanding assumes wider meaning than just knowledge. It involves the personal experience of the researcher as a crucial element in the process of collecting and analyzing information within a specific environment (organization or industry). This is the experience that academic researchers are traditionally lacking, as it cannot be obtained from outside. Furthermore, researchers should restrain from prejudice and be able to change their fundamental viewpoint if reality demands so instead of forcing reality to fit a certain theory. Such theoretical sensitivity would enable them to create new concepts, models, and ultimately new theories. Blocked pre-understanding creates bias and does not allow creativity and innovation. Openness for new information is imperative (Gummesson 2000, 81).

This problem of emergence vs. forcing can be described as inductive vs. deductive research. Inductive research starts with empirical data from which concepts and models are built, eventually resulting new theories. Deductive research starts with theory from which hypotheses are derived and subsequently tested. No matter which way they start, all types of research end up iterating between deductive and inductive. This combination is often referred to as abductive research and should not be regarded as a third type of research. The danger in starting with a hypothesis is that they can be biased, causing that research done by testing them can also reflects the same bias. In addressing this problem, some suggest ignoring theory and conducting hypothesis-free research starting with collecting facts. Others advocate the opposite view, pointing out that utilization of theoretical concepts and hypotheses can not only shorten the observation process, but are necessary in achieving understanding. Gummesson suggests that those views should not be exclusive, but in balance with each other like yin and yang in Taoism. “We could probably say that sticking to established and accepted knowledge is yin and ignoring it and letting our mind freely expand in any direction is yang and that the ideal state should be an oscillation between the two.” (Gummesson 2000, 62-65.)

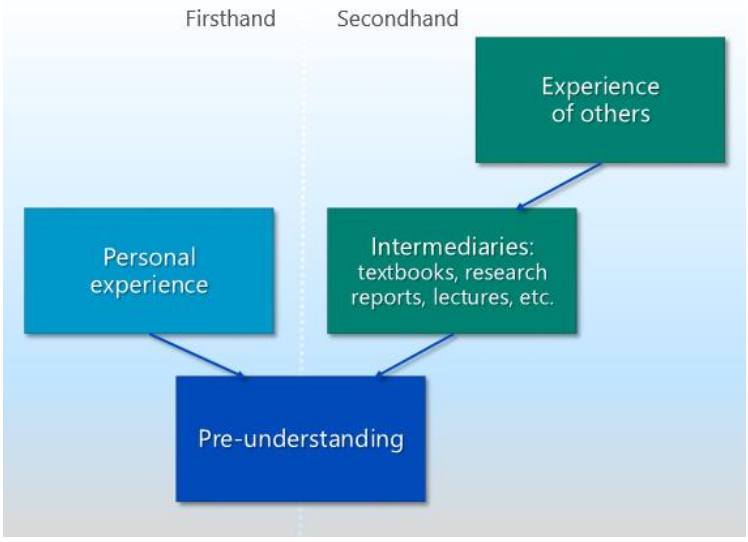

Figure 2: Sources for pre-understanding. (Source: Adopted Gummesson 2000, 67)

Pre-understanding is built from the knowledge that is a result of personal or firsthand experience, and other people's or secondhand experience (Figure 2). Personal experience includes experience from both working and private life, while the second-hand knowledge is obtained via intermediaries. Ideally, they should be in balance.

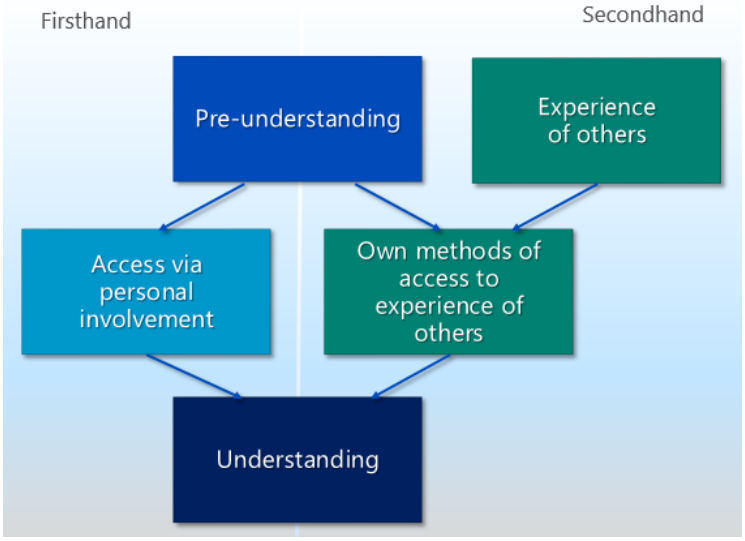

Figure 3: Sources for understanding. (Source: Adopted Gummesson 2000, 71)

Figure 3 describes building of understanding in the context of a research or assignment project. Researchers start a project with certain pre-understanding. They are gaining first hand insights through personal involvement in the process. At the same time, they are obtaining second hand insights by utilizing their own methods for analyzing and interpreting the experience of others. As the project advances, each stage results in a new knowledge that brings pre-understanding to a new level for the next stage. This iterative process is called the her-

meneutic spiral (Figure 4). The following statements are commonly used to illustrate it: “no understanding without pre-understanding” and “understanding of the parts assumes an understanding of the whole”.

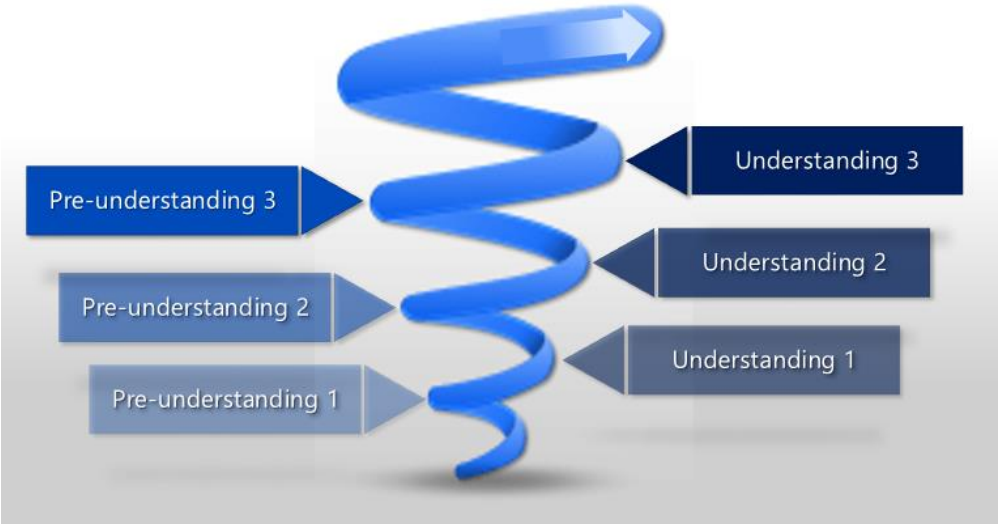

Figure 4: The Hermeneutic spiral. (Source: Adopted Gummesson 2000, 71)

Gummesson points out two major sources of pre-understanding: knowledge and personal attributes. Knowledge includes both general and specific knowledge. General knowledge refers to general knowledge of theories, including models and concepts, and general knowledge of techniques, methods and tools. Specific knowledge includes specific knowledge of institutional conditions in particular industry, company, market, product service etc., and specific knowledge of social patterns in a particular environment, a company for example. Personal characteristics, often critically important for the outcome of an assignment, include intuition, creativity, vitality, and human understanding. (Gummesson 2000, 72-79.)

2.2 The sources of researcher's pre-understanding

2.2.1 Own experience

My experience in computer science, software engineering, and ICT industry spans over almost three decades. ICT experience includes information systems design, development and deployment, project and program management in business-to-business and business-to-customers areas. From 2001 I worked for Nokia, the biggest mobile phones manufacturer at the time, reaching over 40% of global market share. After the acquisition of Nokia's mobile devices and services business in 2013, I moved to Microsoft continuing on similar assignments. Since 2010 I have been focused on managing programs that have been building and introducing capabilities for supporting consumer intelligence, marketing and sales departments. In particular, I have managed activities related to consumer segmentation, digital marketing, Net Promoter system implementation and deployment, out-of-the-box or first use experience, behavioral data collection, phone activation, and development of metrics and insights for marketing and sales. Technologies include big data collection, analysis and reporting, cloud computing. The consumers related issues I was involved with include privacy policy, terms of use, consumer notifications and consents, user experience, collection of personal data, its handling and use, data access and security.

Being directly involved in handling consumer data and privacy, I have gained strong first-hand understanding of the challenges leading high tech consumer companies are facing, among other things, direct or indirect (via local consumer protection authorities or own layers) consumer complaints regarding privacy policy, notification of data collection and data collection itself. There have been cases of authorities' misbehavior, when for example a government authority requested consumer data without notifying consumers, or when the authorities shared obtained data with a competitor. We have spent extensive time to review every change in functionality or new feature against compliance to our own privacy policy and applicable privacy protection laws. This has been made even more difficult by the complexity and misalignment of various local laws and the high cost of keeping the knowledge up to date in order to ensure global compliancy. A typical example of such a challenge would be the dilemma whether we are allowed to collect specific data. If the collection of data is allowed, more questions are arising. Is this case of data collection covered by existing privacy policy or do we need to ask customers for specific consent? If the consent is not needed, do we need to notify customers? And the questions go on and on. There are two aspects to be considered for each issue: what regulations say and what the best practices suggest. It was often challenging for privacy officers to make the judgement. This was not only because of unclear or changing laws, but because the need for continuous risk assessment. Different issues draw different amount of attention in different countries at different points of time. Public sensibility to-

wards a particular issue can change over the time, drawing attention and scrutiny regarding the issue even if the company was perfectly compliant. That can bring negative publicity and negative sentiment, leading to decline in sales and a negative impact on the brand.

Other challenges are related to the quality and freshness of the data. There are many related questions difficult to answer. How long can we keep certain type of data in the system before we need to completely remove it? For which purpose can we use particular data? Can we use it only for product improvement with direct benefit to consumers or also for marketing? Can we share it across the company? Can we combine data? What data are we not allowed to combine? Do we need to change notification to users, or ask for consent? What impact that would have on consumer sentiment, on sales, brand? There are so many obstacles and uncertainties limiting the use of personal data to improve and innovate the offer to increase consumer satisfaction and increase sales. Despite all the challenges, consumer data is considered an asset and a lot of investment is spent to collect, store and process it.

Currently I am working in the biggest Nordic bank Nordea, learning how compliancy to regulations and security of data is even more critical prerequisite for running the business. At the moment we are adopting changes to comply with EU's new General Data Protection Regulation.

2.2.2 Futures study - Datatopia

Clearly, the future is uncertain and cannot be predicted. What we can however do is to imagine multiple futures and get prepared for them. We could even take deliberate actions that could ultimately contribute to our preferred future becoming reality. This thesis is one such modest attempt.

During the second half of 2013 Gartner (2014a) conducted a project set to explore the impact of information and technology on society, business and personal life in 2030. It became known as "Datatopia". This study had a profound impact on the author to take the initial idea of MyData service into serious consideration. Therefore, this whole section is dedicated to explaining the content of Datatopia.

Gartner's project took a crowdsourcing approach. They engaged people worldwide to contribute by writing short essays on the topic. The analysis of these texts defined two dominant dimensions in which four identified scenarios were positioned. Those dimensions were "connected" vs. "conflicted" world, and "controlled" vs. "amok" (out of control) world. The connected world is characterized by aligned goals, where many kinds of technologies interact with each other. On the other hand, in the conflicted world, as goals are conflicting, technol-

ogies are often used to block each other. In the controlled world people clearly know what they want from technology, and they make it happen. When technology gets wild (amok), society responds. Consequently, four scenarios of possible future worlds were derived (Figure 5).

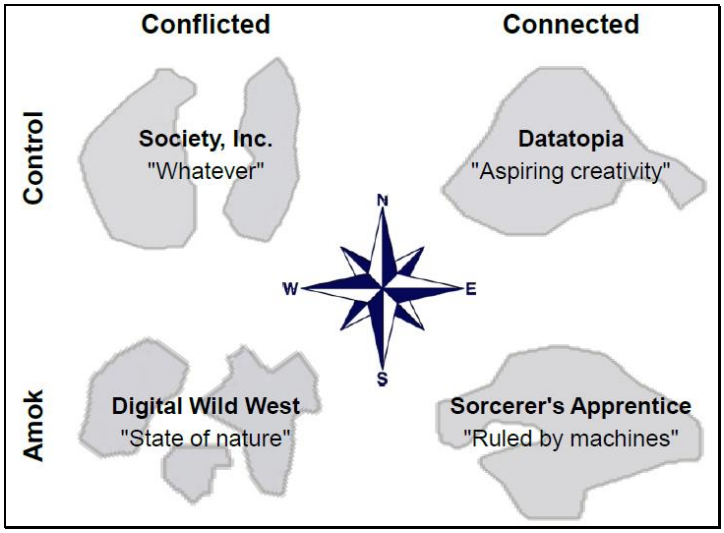

Figure 5: The Four Future Scenarios (Source: Gartner 2014a, 6)

Leaving others aside, focus will be put on the scenario called Datatopia, after which Gartner named the whole study. This is obviously the author's preferred scenario as it has been the preferred scenario by most of the people participating in the study.

The change in data ownership is central in this scenario. Here, the data is owned by the individual, not by the party who collects the data. The data is stored centrally and the owner decides who can access it. Today's privacy problems are solved by implementing privacy by design. For example, the idea of universal identification is likely to materialize and be used in a way that does not reveal unnecessary personal data. Furthermore, privacy can be achieved through random fragmentation of the storage distributed across different clouds. Private keys are used to re-create the data from otherwise meaningless fragments. Data analytics is further developed, as it is assisting every activity. Along with a promise of corporate social responsibility, planet analytics expands in addition to personal and business analytics. Information is much more widely available. Today's social networks are replaced by communities of interest.

Leading organizations are service-oriented, but brands are less dominant as the value is co-created by organizations and people using their products and services.

Clearly, Datatopia will not happen automatically, but the transition would not be driven by regulations nor technology. With more regulations, companies become more cautious and avoid risk taking, while technology innovation is not a driving force towards people having more control over technology. Although there is some possibility that the change can come top-down, the study concludes that the transition is likely to be driven bottom-up. People would engage and take a community approach to control technology.

Information is an asset in Datatopia, as it is in all other scenarios. The Internet of Things also exists demanding increased integration capabilities, data storing and processing capabilities, and powerful analytics. Cybercrime would evolve from hacking systems to more dangerous forms of accessing and altering data. Security strategies would need to move their focus from networks and servers to data. Smart machines would be aiding people and taking over more routine tasks, letting them focus on creative work.

We are often surprised by how quickly the future comes. Only few years after this study was published, we can recognize that many of the predictions have already materialized. But to reach Datatopia, a little push is still required. Here it comes in the form of MyData.

2.3 Preliminary version of the concept

The preliminary version of MyData concept depicting the initial idea is presented in Figure 6. It is based on my pre-understanding of the phenomenon, which was strongly influenced by my last 15 years of professional experience in ICT industry.

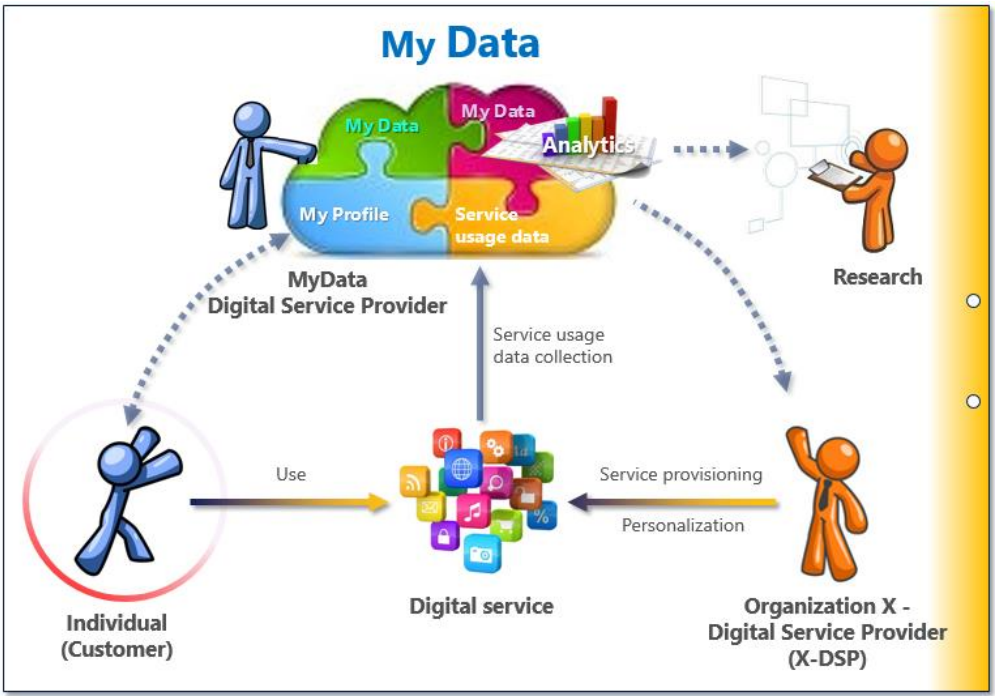

Figure 6: Preliminary version of the concept

The idea of the preliminary concept is as follows. A digital service provider, organization X, is starting to build a digital service that is to be offered to individual customers. To be able to take advantage of MyData service provided by MyData digital service provider, organization X builds their digital service utilizing MyData technology for collecting service usage data. By accepting terms of use of MyData service, organization X renounces ownership of data that will be collected this way in the future, acknowledging that the data belongs to the individual the data is about. In return, organization X gets the access to:

- My Profile data that contains profiles of individuals who are using the service. Individuals are responsible for correctness, completeness, and availability of their profile data.
- Service usage data. The structure of the service usage data is standardized for all the services. Service usage data cannot be altered by the data owner.
- Other service related data originating from the customer in a free text of structured form, for example feedback, preferences, suggestions, questions, etc.
- Data analytics for service usage and profile data. This part of the service would offer some of the standard tools for data analysis and provide some in-built types of charts.
- Tools for collecting other service related data, for example feedback questionnaires and Net Promoter Score (NPS).

The agreement does not prevent organization X from collecting primary data, i.e., data required for the service to function. This agreement regulates the collection of secondary data,

i.e., service usage data. The agreement prevents organization X from possessing customer's profile data and from using it for any other purpose outside of MyData system.

When the service is being taken into use, two-way acceptance of terms of use takes place. The customer accepts service's terms of use, and organization X accepts terms of use of customer's data.

During the use of the service, usage data gets collected in MyData database. By utilizing MyData Analytics service, organization X is learning about the customer and service usage to further improve and personalize the service. Organization X can further query and contact those customers directly who have declared their availability for such enquiries and further involvement.

Access to customer profile and service usage data and the availability of analytics tools helps startups to iterate quickly through improvement loops giving them competitive advantage even against established companies. This would in turn encourage established companies to utilize MyData. As the number of organizations using MyData increases, the volume of personal data also increases, making MyData more attractive for other organizations to join. Therefore, it appears crucial to attract startups in the initial phase.

Customers access MyData to:

- Manage their profiles, collected data and manage access rights
- Observe data usage and related statistic (who, when, what, etc.)
- Give feedback and further engage with organizations that provide digital services for example in co-designing improvements

Customers can delete their service usage data. However, since personal data is considered an important personal asset, the possibility of deleting it should be dealt with utmost consideration. That is why more study is needed around allowing deletion of personal data.

MyData can be used for various research purposes and services innovation. Data is anonymized when used for those purposes.

Organization X can contact individual customers with relevant profiles, who have declared their availability, to engage them in further studies and eventually in the co-design and co-creation of improved service.

MyData digital service provider provides MyData service. It is collaboratively governed by all customers whose data is kept in the system. MyData digital service provider is a non-profit

organization, some sort of leaderless or peer-based organization (Nielsen 2004) built with a help of crowdsourcing. Its number one priority is to gain and sustain trust.

Benefits of MyData service would be the following:

- For individuals:
    - Personalized services delivery, timely, contextual
    - Personal data ownership
    - They have their voices heard (also through giving and restricting access), to make an impact on service improvement and innovation
- For organizations:
    - Develop new services and improve them quickly
    - Personalize services
    - Competitive advantage
- For MyData:
    - Enabling the whole concept

3 Literature review

3.1 Service Dominant Logic

Service Dominant Logic (SDL) proposes that in the focus of economic exchange is a service instead of goods. Organizations, markets and society are fundamentally concerned with exchange of service seen as applications of competences (knowledge and skills) that humans provide to others for the service they need in return. Therefore, service is exchanged for service, all companies are service companies, and all markets, economies and societies are based on service exchange. (Lusch & Vargo 2006, 43)

SDL is based on concepts of value-in-use and co-creation of value. Rather than the value embedded in a product, value here refers to the customer's meaning of service in their use context. Value is always co-created between company and customer. Value co-creation happens when a customer personalizes his experience using a company's product-service offering (value-proposition) to a level that is best suited to get his job done (Rampen 2009). For the company, it allows to derive a greater value from its product-service investment in the form of new knowledge, higher revenues/profitability and/or superior brand value/loyalty.

3.1.1 Innovation from service-driven perspective

Concepts of innovation have also evolved with a paradigm shift. Goods innovation was focused on producing better output (goods) through technological advancement and more efficient corporate processes. Initial services innovation approaches were based on the idea that service innovations are fundamentally similar to manufacturing innovations, thus also aiming on producing better output – in this case "services".

Innovation based on service centered approach however, extends the process of value creation beyond the company's operations to include active customer and stakeholder participation through co-creation. This collaboration nowadays happens in a complex and dynamic system of actors (ecosystems) that are co-creating value and, at the same time, providing the context in which the value is individually and collectively assessed. From an SDL perspective, innovation becomes a way for enhancing one's own value co-creating activities through resource integration and service provision to assist other actors in ecosystems in their own value-co-creation. (Vargo 2013b, 8-10.)

Modern economy has been characterized as 'knowledge economy' since 1990s, when creating and maintaining a knowledge base used to be a central task. Recently the focus from

knowledge has shifted to the ability for rapid learning. Today's knowledge economy has become an innovation driven economy (Toivonen & Ylén 2013, 19).

Challenges in implementing an innovation driven view according to Toivonen & Ylén (2013, 19) are the links to still dominating thoughts about the nature of innovation, perceived as overly narrow and scientific. The authors point out that the emerging broader view of innovation suggests that a more efficient approach would be innovation intertwining and co-evolving with practical activities ('learning-by-doing', 'learning-by-using', and 'learning-by-interacting'). However, Toivonen & Ylén conclude that there are no such rapid-innovation models that would provide a credible alternative to the in-house R&D process model and suggest SDL as basis for building an alternative innovation model. They explore several ways in which SDL contributes to the search for further rapid-innovation models (creation of shared experience, focus on the user, innovations with value, application of dynamic modeling tools), concluding that it is in line with the so-called broad view on innovation. The core of this proposed approach is a shift from a product- and R&D centric view to an actor-, resource-, and system-centric view, where the focus is on dynamic systems of multiple actors (both organizations and individuals) that co-create value and new markets (Toivonen & Ylén 2013, 21).

This approach is largely applied in developing the innovative concept of MyData service. This new service is placed in the context of PDE that is a dynamic system of multiple actors: individuals, organizations and governments. The innovation itself focuses on assisting actors in their own value co-creation, aiming towards increasing and maximizing the value that is both individually and collectively assessed, and balanced with competing rights and risks for all the actors. It demonstrates a crucial shift in focus, from being concerned about solving R&D challenges in service creation towards addressing challenges multiple actors are facing in a misbalanced PDE.

3.2 Design thinking and wicked problems

As the author of the thesis is an aspiring designer with background in computer science, it is important to address the differences in types of problems scientists and designers are addressing and the different methods they use. Designing MyData concept is creating something novel that does not exist yet, a solution for a design problem. Therefore, understanding the nature of design problems is critical in guiding the process of designing the solution. An overview of design thinking processes and the choice of the process that was applied is elaborated in section 1.18.3 Design thinking and process models.

In his essay “Wicked Problems in Design Thinking”, Buchanan (1992, 5-21) characterizes design thinking as a “new liberal art of technological culture”, placing it in the context of a new integrative discipline to complement arts and sciences. He points out that the problem of communication between scientists and designers has been evident and under discussion for quite a long time. According to Buchanan, the problem of communication is rooted in differences between types of problems addressed by scientists and designers. Scientists practicing design thinking are working in their own specialized areas using specialized methods, while designers are addressing problems that rarely fall under one subject area only, thus utilizing different patterns of reasoning.

The wicked problems approach to design builds a connection between various applications of design. Formulated by Horst Rittel in the 1960s, presented by Churchman (1967), when design methodology was in the focus of discussions, wicked problems approach points towards an alternative to the linear model of the design process (Buchanan 1992, 5-21). The linear model essentially sees the process of design thinking as a sequence of two phases: problem definition and problem solving. Problem definition is the analytics phase where the problem is specified in details and requirements for successful solution derived. The subsequent problem solution phase is a synthesis phase in which the solution concept and the implementation plan are created. Many scientist and some designers consider the linear model helpful for the logical understanding of the design process. However, in practice, the linear model of design thinking seems inappropriate for the problems addressed by designers which are, Rittel argues, by their nature mostly wicked. The first report of Rittel’s concept was presented by Churchman in his editorial “Wicked Problems” in Management Science (Churchman 1967). There wicked problems were described as “a class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and when the ramifications in the whole system are thoroughly confusing.” The linear model is appropriate for solving determinate problems that can be precisely specified. Rittel (1973, 160) points out that the problems social planners (designers) are facing are inherently different from those scientists and to some extend engineers are dealing with. Most but trivial design problems are by their nature indeterminate and therefore wicked. Rittel lists and elaborates ten characteristics of wicked problems (1973, 161-167):

1. There is no definitive formulation of a wicked problem.
2. Wicked problems have no stopping rule.
3. Solutions to wicked problems are not true-or-false, but better or worse.
4. There is no immediate and no ultimate test of a solution to a wicked problem.
5. Every solution to a wicked problem is a "one-shot operation"; because there is no opportunity to learn by trial and error, every attempt counts significantly.

6. Wicked problems do not have an enumerable (or an exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.
7. Every wicked problem is essentially unique.
8. Every wicked problem can be considered to be a symptom of another problem.
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution.
10. The social planner has no right to be wrong (i.e., planners are liable for the consequences of the actions they generate).

The question remains, why design problems are indeterminate, therefore wicked? In his essay, Buchanan offers the answer (1992, 16). It is because design has no specific subject matter on its own. When applying design thinking in given circumstances, designers invent a subject out of existing problems. Opposite to that, scientific disciplines are focused on defining a subject matter by understanding related principles, laws, and rules. Scientific subject matter can be undefined, calling for more research, but it cannot be truly indeterminate. On the other hand, quasi subject matters invented by designers are not undetermined subjects that are to be made determinate, but indeterminate subjects that are to be made specific and concrete in an attempt to conceive and plan what does not yet exist. Quasi subject matter describes a problem in specific circumstances and a set of issues to consider in its resolution, including the views of all relevant actors. This leads to an invention that is the embodiment of a working hypothesis and the vehicle for further testing and exploration. In this non-linear process, problems and issues are repositioned to discover new possibilities and shape new inventions. (Buchanan 1992, 14-19.)

From this perspective, when conducting literature research to obtain understanding of underlining problem or problems as done for this thesis, it is important to keep their wicked nature, i.e. their indeterminateness, in mind. The problem cannot be precisely formulated, but it can and should be repositioned to explore the full potential of innovation.

3.3 Definitions

For the purpose of this thesis the following definitions related to personal data are used. Unless explicitly otherwise indicated, the source of the following definitions is EU directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data (EU 1995).

Personal data means any information relating to an identified or identifiable individual (*data subject*).

Processing of personal data (*processing*) means any operation performed upon personal data, automatically or not, such as collection, recording, organization, storage, adaptation or alteration, retrieval, consultation, use, disclosure by transmission, dissemination or otherwise making available, alignment or combination, blocking, erasure or destruction.

Data controller means a competent *party* who, according to applicable law, determines the purposes for which and the manner in which any personal data are, or are to be, processed.

Party means a natural or legal person, public authority, agency or any other body.

Processor means party which processes personal data on behalf of the controller.

Third party means any other party other than the data subject, the controller, the processor, or parties authorized by the controller or by the processor to process the data.

Recipient means any party (third or not) to whom the data is disclosed.

Data brokers are companies that collect personal information about consumers from variety of public and non-public sources and resell the information to other companies. (UNC 2015)

Personal data ecosystem (PDE) consists of actors (individuals, organizations from private sector, government and public sector) and their interactions in processing of personal data for mutually beneficial purposes. This definition is adopted by the author for the purpose of this thesis. Private sector, being a part of national economy that is not under direct government control, includes multinational corporations, small and medium enterprises (SMEs), telecommunication companies, private healthcare providers, financial institutions. Public sector is defined as the national, regional, and local governments plus institutional units controlled by government units like healthcare providers, public education, police, military, infrastructure providers (roads, water supply, electrical grids, telecommunications, etc.), and regulatory

bodies. In this thesis for simplicity sake ‘organization’ is used in reference to private sector and ‘government’ to public sector. Therefore, there are three major types of PDE actors considered: individuals, organizations, and government.

There is no commonly shared definition of PDE. Cavoukian & Green (2012, 5), describes PDE as “the emerging landscape of companies and organizations that believe individuals should control their personal data, and who make available a growing number of tools and technologies to enable this”. The author of the thesis considers this description too narrow as it excludes numerous other organizations (from both private and public sectors) that are processing personal data, having different beliefs, as such being part of the problem rather than solution. Therefore, PDE is not a “to be” state, but an already widely existing system with all its deficiencies that are being improved.

3.4 Characteristic of personal data

Considering the way in which the data is created, personal data can be classified as volunteered, observed and derived (Figure 7). Volunteered data, created and released by individuals, include emails, photos, videos, tweets, blogs, likes, comments, etc. Observed data are created in interaction between individuals and organizations. Examples are: browsing history, location data from mobile phone, purchase history, credit card use. Derived data is created as a result of data mining, combining, and analysis of volunteered and observed data. Examples are: credit scores, predictions of preferences and purchase intent. For individuals, the sense of ownership is strongest towards volunteered data, declines for observed data and is lowest for derived data. However, the sense of uneasiness and suspicion has opposite tendency. It grows when the data is created further away, being highest for derived data. On the other hand, organizations demonstrate highest level of ownership towards derived data, treating them as their proprietary asset. Ownership further declines towards volunteered data. (WEF 2012, 18-19.)

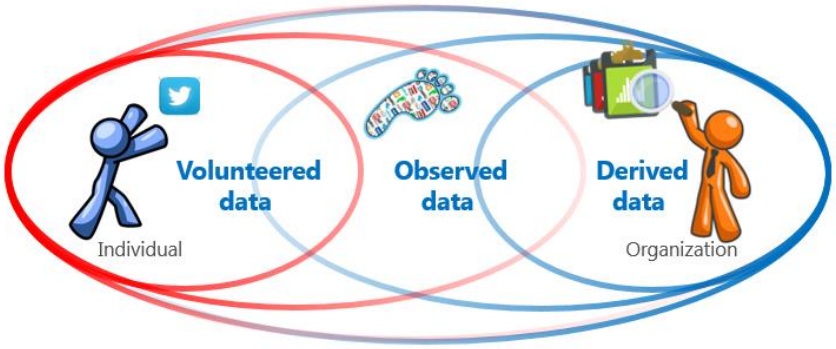

Figure 7: Types of personal data. (Source: Adopted WEF 2012, 18-19)

Personal data can also be categorized based on sensitiveness or the level of privacy. For example, according to EU regulations the special categories of personal data are racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, genetic and biometric data, data concerning health or data concerning a natural person's sex life or sexual orientation (GDPR 2016).

Personal data possesses inherent characteristics of digital data, it can be endlessly copied and reused, distributed globally, and when connected to other data have the potential to increase in value but also to increase the opportunity for misuse. Additionally, personal data is linked to people's identity. These characteristics make personal data uniquely different from other assets like commodity goods, oil or gold, imposing specific challenges and opportunities. (WEF 2012, 7)

Personal data is big data. It comes in large volumes, variety (structured like numeric data from databases, and unstructured like texts, email, video), velocity, variability and complexity. On average, each individual releases 700 pieces of personal information a day (Hildebrandt 2013, 91). For example, according to Radicati Group's report (2017), the number of emails sent and received per day will reach 269 billion in 2017 and 319.6 billion per day by the end of 2021. The number of SMS messages sent per year is around 8 trillion (Portio 2014). According to InfoTrends' 2016 worldwide image capture forecast, reported by Perret (2016), there will be 1.2 trillion digital photos taken in 2017. Yet, the volume of volunteered data fades in comparison to observed data. Number of mobile phone users will have reached 4.77 billion by the end of 2017 (Statista 2017). Via installed apps or directly, mobile phones are collecting myriad of data, including location, information, social interactions, Internet browsing, transactions, etc. An extensive analysis of the latest Internet trends is done every year by Kleiner Perkins Caufield & Byers (Meeker 2017). Apart from mobile phones, there is a growing number of other devices collecting personal data including TVs, tablets, cars, medical devices, points of sale machines. Furthermore, the Internet of Things (IoT) is rapidly expanding with increasing number of all the "things" connected to Internet. "Things" refer to physical objects embedded in electronic, software, sensors and connectivity that can exchange data among themselves and operators. The estimated number of connected things by 2020 differs based on the source: from 25 billion by Gartner (2014b), 40.9 billion by ABIresearch (2014), 50 billion by Cisco (Evans 2011), up to 75 billion by Morgan Stanley extrapolated from Cisco's figure, reported by Proffitt (2013). The number of applications and innovative services enabled by the Internet of Things is already exploding touching every aspect of modern living. Examples include: cars with built-in sensors, heart monitoring implants, biochip transponders on farm animals, smart industrial management systems integrated with smart electrical grid, energy efficient homes, etc. Many of these applications are collecting or using personal data.

3.5 Potential of personal data

The importance of personal data and its potential has long been recognized. In the keynote speech given in Brussels on 31 March 2009 in Roundtable on Online Data Collection, Targeting and Profiling, European Consumer Commissioner Meglena Kuneva characterized personal data as "the new oil of the Internet and the new currency of the digital world." (Kuneva 2009, 2). The World Economic Forum's Rethinking Personal Data Initiative has defined the value of personal data as an asset class comparable to traded goods, gold or oil (WEF 2012, 7).

The potential is coming from the growing quantity and quality of personal data and the rapidly improving big data and analytic capabilities, capable of connecting different data sources, finding patterns and creating insights. This way, the WEF study (2012) concludes, personal data provides huge value for improving the life of individuals, solving problems in society and powering innovation and economic growth. Individuals can satisfy their specific needs better through personalized services and information, and they can also find and engage with people with similar interests, take actions etc. By using personal data, governments can more effectively respond to global crises, protect public safety and health, ensure low enforcement and increase national security. For organizations, increased access to personal data can boost development of new innovative products and services and increase the efficiency of ongoing operations.

In an Accenture study from 2015 based on the survey of 600 companies world-wide, Cooper (2015, 4) emphasizes the business criticality of personal data. The surveyed companies collect personal data through multiple channels to achieve higher benefits for themselves and their customers: 79% directly from individuals (e.g. via online accounts), 42% from commercial or data-sharing partnerships, 33% from connected devices, and 33% from third parties. The key benefits for companies include the increase in their abilities to deliver better customer experience (by 77% respondents), enter new markets (52%) and make products more innovative (50%). For customers, the benefits include wider choice, increased convenience, bigger discounts and more personalized user experiences. A survey conducted by Microsoft (2015) found that 56% among 16.500 respondents from global markets were "much more likely to buy from companies who allow them to shape their products or services". Other surveys found that 70% of participants were willing to share search terms for services that enable fewer steps to get things done, while 79% would share gender information for services that bring something new for users based on that information (eMarketer 2015).

Analysis shows that the value created through personal data can be huge. According to the Boston Consulting Group (BCG) (2012a, 3), applications built on personal data can bring a quantifiable annual benefit of approximately €1 trillion in Europe alone by 2020. Organiza-

tions would benefit €330 billion annually, while benefit for individuals would be much higher as the consumer value would be €670 billion annually. The combined total value of personal data could reach 8% of EU-27 GDP.

Yet, the full potential remains restricted and unknown since the data are isolated, its free flow is restricted and regulations are lagging behind the rapid changes. The above-mentioned BCG study (2012a, 3) concludes that two thirds of potential value is at risk if stakeholders fail to establish a trusted flow of data.

Other BCG study (2012b) on the Internet economy in the G20, estimated growth of online retail between $1,5 trillion and $2,5 trillion by 2016, dependent on the consumer perception of trust in how personal data are used. These cases, covering rather smaller parts of the larger global PDE, indicate the huge impact that establishing trust plays.

Numerous studies and authors agree that establishing trust in PDE is the key for succeeding in realizing the full potential of personal data (WEF 2012; BCG 2012b; Hildebrandt 2013; WH 2014). Empowering individuals to own their personal data, giving them ability to share more about themselves and actively engage in trusted relationships with organizations and governments, would further fuel innovation, growth and advancement of society (WEF 2012).

3.6 Challenges in Personal Data Ecosystem

A study for WEF (2012) points out that the key challenge in personal data ecosystem lies in the decline in trust among actors. This is evidenced by numerous examples of security breaches, identity thefts, concerns about quality and use of personal data, confusion from organizations about what can and cannot be done with personal data, and increased pressure and sanctions from regulators.

3.6.1 Challenges from the perspective of individuals

Transparency

Individuals are losing trust in ways the data about them are collected, shared, combined and used by organizations and governments. In Europe, 72% of citizens are concerned about the misuse and unpermitted sharing of their data (Reding 2012). One of the most serious concerns people have is connected to the use of medical data by insurance companies or employers to discriminate them (WEF 2012, 20).

There is a lack of transparency in what kind of personal data are collected. People are unaware how much they are tagged, tracked and followed on Internet, or regarding the usage of mobile devices, how much data they implicitly give away, how data may be used, what is known about them (WEF 2011, 17). They are accustomed to using “free” services like social networks, search engines, email providers, news sites, and online shopping sites, and then realize that they are victims of often unwanted targeted advertising that is based on data collected about their online behavior. As it has been widely quoted “If you are not paying for it, you're not the customer; you're the product being sold” (Lewis 2010).

Even if people are not using “free” services, they still can be tracked. If one accesses a web page that has a “like” button, the information that one has accessed the page is automatically sent both to the host site and to Facebook. That way Facebook can track the person’s web browsing activities even if they are not logged to Facebook.

According to a Big Data Survey done in the US in support of the Big Data study (WH 2014), 80% of respondents were very much concerned about ensuring transparency and oversight in data practices. Even when it came to the area of the least concern, the collection of location data, 61% indicated very much concern. US respondents were most concerned about how intelligence and law enforcement agencies are collecting and using data about them, especially when they have little insight into these practices, scoring them with 67% and 53% respectively of “not at all” level of trust. Business follow with 42%, while the most trusted were professional practices (like law and medical offices) and academia.

Profiling

Individuals are subjects of profiling that is becoming more and more extensive. It is likely that people not-knowingly appear on many lists. One can be listed as a victim of crime, depressed, impotent, or even as one of those who can easily be deceived if he happens to be victim of so called “vulnerability based marketing”. When used in uncontrolled ways for unauthorized purposes like data-driven hiring, lists can become bases for race, class, or disability discrimination. Those profiles and lists are assembled and sold by data miners, brokers, and resellers. Buyers are traditionally marketers and increasingly financial institutions. Marketers are not incentivizing perfect data accuracy. As they typically want to increase percentage of hits by improving targeting, it does not matter whether every name on the list is the right one. When inaccurate lists are used for discriminatory purposes, great damage can be done to individual’s reputation. (Pasquale 2014.)

There were about 4000 data brokers in the US in 2013 (Dixon 2013). Acxiom is one of the largest, with about 1,500 pieces of data on more than 500 million active consumers worldwide.

Their operations are brought to light in a The New York Times article by Singer (2012). Traditionally, data is mined and analyzed at large scale from publicly available information, like customer surveys, often containing sensitive financial and health information. Additionally, people's online activities have been tracked for the purpose of digital marketing using cookies. More comprehensive techniques have been developed to cover multi-channel data collection, including online, offline and mobile, to build 360-degree view on consumers. But companies like Acxiom are not just collecting data available out there; they are developing sophisticated ecosystems to prompt consumers to volunteer enough personal data — like their names, email addresses and mobile numbers. This way hundreds of collected and linked details about individuals and households are sold to companies who are then able to identify individuals concerned with, for example, diabetes or get to know household incomes in order to properly target and customize their campaign messages. Lists of these details contain delicate information that could be misused by third parties, especially concerning vulnerable groups. People's interests, like weight loss, gambling, needing money, are example of such details, which Acxiom claims are derived from actual purchases and surveys. Profiling based on religion, race and ethnicity, country of origin is especially problematic if the information is incorrect or if people do not want to be treated based on stereotypes.

There are various problems associated with data behind those lists. Data are not accurate. Even when particular information is accurate it is often not relevant for the purpose it is used. Furthermore, people are not informed that such lists exist and have no opportunity to correct false information. Discrimination in secrecy, unknown unfairness cannot be detected nor corrected. (Pasquale 2014.)

As Dixon & Gellman (2014) in their report "The Scoring of America: How Secret Consumer Scores Threaten Your Privacy and Your Future" point out, consumer scoring is not necessarily good or bad, but scores can be correct or false or misleading. When used correctly, i.e. if the scores are derived from the correct data, and scoring models are correct and non-discriminatory, benefits are real. Both business, specifically marketing, and consumers are among those who benefit from consumer scores. The report concludes that major problems with scoring are related to secrecy about the very existence and use of scoring and scoring methodologies, data quality and accuracy of the models, the use of sensitive information, the relevance of the data used in scoring and the rationality of its application (thousands of factors used). Consumers cannot opt out from scoring, nor repair their scores when they are the victims of identity theft. Many if not most of the new consumer scores are unregulated, relying on the use of discriminatory factors like sex, marital status, religion, race, or national origin, and other sensitive factors like financial and health data. As such, they are in breach of the Fair Information Principles (OECD 2013). The Fair Information Principles, seen as the bases for most privacy laws, include principles of collection limitation, data quality, purpose

specification, use limitation, security safeguards, openness, individual participation, and accountability (Gellman 2017).

As a conclusion, the new era of consumer profiling raises concerns about the extreme effects it can have on peoples' lives. The distressing reality is that data brokers' ranking systems classify some people as high-value prospects, offering them regular discounts and marketing deals, while dismissing others as low-value prospects labeling them as "waste". Problems in scoring can affect individuals in a way that is neither fair nor even legal. It may not be very important if one doesn't receive discount offer for holiday trips, but when someone is not considered eligible for a job or a bank loan, scoring issues can significantly affect people's life.

Control

Individuals are lacking control over their personal data. There is limited or no awareness and control over derived data and insights and their use (WEF 2012, 19). There is also an evident lack of contextual control and permissions over personal data, as the impact of personal data differs when shared in different contexts (WEF 2012, 10). For example, healthcare data have a different impact when shared in healthcare, or at work, family or social context.

According to the UK's Information Commissioner's research reported by Ctrl-shift (2011, 5) regarding public perception of personal data issues, the way organizations manage personal data has become the consumers' second biggest concern behind crime. According to the same research, only 49% individuals in the UK think that organizations handle their personal data in proper and fair ways, while 59% feel that they have lost control over the way their data is collected and processed.

Privacy

Consumer research conducted in a BCG study (2012a) finds that 88% of Internet users consider at least one industry sector threat to their privacy. Trust differs per sector, having for example e-commerce companies among the most trusted with whom 30% of people are willing to share data. Sensitivity of shared data is also an important factor. More than 80% of people demand opt-in for sharing highly sensitive data.

There is however a contradiction between individuals' concerns and their actual behavior. 82% respondents would like to make the decision whether to allow data use in each instance, while at the same time 63% would not like to be asked about the same information each time they access the website (BCG 2012a). Privacy policies are lengthy, complex, and difficult to

read and understand and therefore are rarely read. As such, they are rather liability disclaimers for organizations than support for consumers to make rational decisions (WEF 2012, 10, 24). Only in the US, the estimated cost of the time required to read privacy policies is $781 billion annually (McDonald & Cranor 2008, 2).

Indeed, at the same time, while people care about privacy, they also share their information quite widely in social networks and elsewhere on the Internet. This obvious conflict between control and convenience requires balanced solution.

Personal data has both private and commercial value. In the monetization of their data, individuals can gain benefits but more often they lose in the bargain. While consumers can benefit from targeted offering (Anand & Shachar 2009), they may be exposed to significant costs and the violation of their privacy (Stone 2010). There are three types of targeted offerings: targeted advertisements, customized products, and tailored prices (Montes 2017). Montes et al. Analyze the effects of price discrimination suggesting actions for companies, consumers and policy makers. Research in the economics of privacy continues to expand due to rapidly emerging issues of privacy protection. Acquisti et al. (2016) point out that in both economic theory and empirical analysis of privacy, different scenarios can lead to both positive and negative effects on privacy protection and on individual and social welfare. They also observe that consumers are typically not aware of the consequences of sharing and protecting their personal data and threats to privacy, therefore market interactions involving exchange of personal data happen without their informed consent.

Privacy is undermined in numerous ways. Secret tracking is one example. According to an article by Singer & Chen (2015), unlike Internet users who can delete cookies to avoid tracking, Verizon's mobile users cannot delete "supercookies", enabling Verizon to continue tracking them even when users thought they have prevented tracking. Using this and other techniques. Verizon is collecting and selling consumer intelligence to advertisers.

The lack of control over personal data undermines privacy. Having control over their data, individuals can decide how much to share, effectively exercising the right to privacy. The BCG study (2012a) concludes that, given proper privacy controls and sufficient benefits, most consumers are willing to share their personal data with organizations from both private and public sector.

Another source of privacy concerns is government surveillance. One of the most revealing cases is Edward Snowden's disclosure summarized in Franceschi-Bicchierai's web writing (2014). The following claims are presented by Franceschi-Bicchierai, however they are not verified by scientific literature. The released files show that NSA has access to virtually all

phone records in the US. Information include so called metadata including information about who called, when, for how long. In addition to phone calls, NSA collects text messages, 200 million worldwide through program called Dishfire. From this nformation, all kinds of personal data are derived including people location, traveling, financial transactions, even passwords. A tool called PRISM is used to collect and process “foreign intelligence” that goes through servers in the US on request. Most of the content belongs to Yahoo, Google, and Microsoft, while the rest comes from AOL, Facebook, Apple, PalTalk, YouTube, and Skype. Practically all types of data are monitored including emails, chat, videos, photos, etc. The British spy agency Government Communications Headquarters (GCHQ), taps fiber optic cables across the world to intercept data flowing through the global Internet. Through a program called Tempora, GCHQ is sharing data and intelligence with NSA. NSA is using a tool called XKeyscore to search through almost everything users do on Internet. As the data flowing on the Internet are usually encrypted, NSA is putting a lot of effort into breaking or circumventing encryptions, typically demanding from companies to provide backdoors in their software. Since the encryption is meant for protection from unwanted access including spies and hackers, demands from NSA undermine mobile and Internet security and invade people's privacy in the name of cybersecurity. It also creates vulnerabilities that invite malicious attacks and thus undermines the competitiveness of the largest US companies. When the bulk surveillance of PRISM does not provide needed details, NSA can infiltrate deeper in the infrastructure, for example in links connecting data centers of companies like Google and Yahoo. Also, NSA has an elite hacker team called TAO (Tailored Access Operations) that can hack into computers worldwide. NSA also spies on foreign governments and leaders. (Franceschi-Bicchierai 2014.)

Data breaches and identity theft

Each of the most recent biggest data breaches resulted in the exposure of huge amounts of personal information and identities. The website breachlevelindex.com maintains a comprehensive database of data breaches since 2013, while informationisbeautiful.net (2017) provides great visualization of these cases with links to sources. Some of the most infamous data breaches are Yahoo with at least 500 million stolen user account credentials in 2014; spam operator River City Media with 1.37 billion email addresses and for some cases names and real-world addresses stolen in 2016; Friend Finder Network 412 million records stolen in 2016 including usernames, email addresses, passwords, IP addresses.

Data breaches are the greatest risk factor for identity fraud. According to Javelin’s 2014 Identity Fraud Report (2014), 13.1 million consumers in the US suffered identity fraud in 2013 alone. One out of three people who received data breach notification letters become victims of fraud. This is up from 1 in 4 in 2012 and 1 in 5 in 2011. For example, 46% of consumers with breached debit cards are most likely to become fraud victim. The number of non-card fraud

victims (including compromised lines of credit, internet accounts, and email payment account like PayPal) has nearly tripled. The report pointed out that criminals are becoming more effective in using information they obtain from data breaches. (Javelin 2014.)

Managing own identity

Individuals are facing the need and also the concern about ability to manage their digital identity. Internet is built without an identity layer, which is preventing individuals to know who and what they are connecting. Consequently, they are exposed to thefts and deceptions, resulting in the erosion of public trust in the Internet. (Cameron 2005).

Personal data is difficult to collect as it is scattered across many different organizations individuals are engaged with. Organizations do not make personal data readily available for individuals, making collection effort inhibitory (Ctrl-shift 2011, 11, 16; WEF 2012, 26).

Managing one's digital life is difficult. For example, it is difficult to remember different passwords and ways to log in. This is because of the organization centric approach for solving identity problems (Ctrl-shift 2011, 9). People often reuse the same password in most of their accounts making it easier for identity thieves. In the light of all the threats and loss of trust, people simply do not know how to manage their online identity and their digital life, continuing to share their personal information increasing the risks (WEF 2012, 10).

Filter bubble

In his article “How Silicon Valley is erasing your individuality”, Foer (2017) analyzes how big Internet companies are personalizing information offering and its effects on people. Facebook presents filtered links to users to their friends’ posts based on information which links users click on. It also filters the news guessing what users would like to read. When started, neither the algorithm nor the fact that this is being done was made public. In recent actions during 2017, Facebook has reversed some of these features under the pressure of growing concerns. The results of Google searches can also be very different for different people. Searches are personalized based on tens of different types of data including our location, the type of computer and the browser we use, etc. Neither this is made public, so it is hard to discover it or compare search results. Yahoo news, one of the biggest news sites, is also personalized. Others, including The Washington Post and The New York Times, are following the same path.

Internet is evolving in the direction to offer us what it guesses we want to see, but not what we really want to see. As a result, people can end up isolated in their own cultural or ideological bubble, separated from the information that is confronting their viewpoints. This notion

is named “filter bubble”, by internet activist Eli Pariser, author of The Filter Bubble: What the Internet Is Hiding from You (Pariser 2011). “Instead of a balanced information diet, you can end up surrounded by information junk food,” Pariser claims. By automating choices, what people are going to buy, eat, read, who to connect with, what places to visit, Internet companies are creating a vicious cycle that is pulling people deeper in resignation. By doing that they compromise people’s free will and undermine their individuality. Recognizing this threat, calls for the change of the course are made. (Foer 2017.)

3.6.2 Challenges from the perspective of organizations

Lack of trust

Organizations also face issues of trust towards individuals as people are behaving inconsistently, saying one thing and doing another (WEF 2012, 16).

Many organizations are facing issues when increasing transparency on how personal data are used as customers, instead of welcoming it, often react with anger about what has been revealed (WEF 2011, 17).

When collecting more data than necessary, organizations appear more intrusive. Therefore, the amount of data organizations collect may have negative impact on their relationship with customers. (Ctrl-shift 2011, 18).

Legislation and regulatory issues

Regulations are complex, discriminative, and outdated. Organizations are often confused about what they can and cannot do with personal data, as they are unsure of rules about using personal data and concerned about legal liabilities (WEF 2012, 11).

Organizations across different sectors are discriminated by regulations on use of personal data (WEF 2011, 8). Personal data systems related to banking have different purposes and applicable laws than those developed for the telecom and healthcare sectors. Some areas are perceived overregulated. Furthermore, established companies and startups are not in the same position to compete in creating new services based on personal data (WEF 2011, 18). Established companies typically possess a lot of personal data and they are facing legal constraints for its commercial use. Without such burdens, startups can build new services around personal data often at the very edges of legislation.

Generally, legislation is lagging behind, raising concerns that it cannot keep up with the speed of innovations, the growing complexity of PDE and its impact on individuals (WEF 2011, 18).

Fear of negative impact on brand and company image

Companies are dealing with the constant risk of crossing the line of what customers would consider fair use of their personal data. If the use of personal data is characterized as non-fair, it can be penalized resulting in a negative impact on the brand (WEF 2011, 8).

Increased attention and sanctions from regulators are evident (WEF 2012, 9). Global companies are especially alarmed as the situation differs across the markets and is constantly changing. For example, a case of misuse of data by a competitor can increase attention towards a particular industry sector and increase sensitiveness of the public in a particular country regarding certain issues. This would in turn prompt the company to reassess the risk of ending up in a similar situation with a negative impact on company image as higher, and put additional effort to reassess related practices and strengthen compliancy. Urgency is high because widespread negative coverage in media on improper use of personal data nowadays is almost instant. Therefore, it is not enough to only follow and comply with changes in applicable local laws, but it is necessary to follow the ever-changing sentiment of the public and anticipate the reaction of regulators in each country. Nokia is a global company where the author of the thesis was in position to witness these challenges.

Data capture and access issues

In the current organization-centric environment, each organization collects observed data about customers interacting with their services. Customer data is spread across hundreds of organizations. None of them possesses a full picture but only a narrow view about individuals and their activities. (Ctrl-shift 2011, 4) If organizations wish to share data with each other, they may end up in invading the privacy of individuals and in breach of regulations. As a result, data is often duplicated and wasted, and opportunities are lost.

Personal data, collected under different consents, remain locked in organizational silos, separated by different technical standards, lacking interoperability and portability (WEF 2012, 9; Poikola 2014, 5). As the data is usually stored in distributed systems, multiple parties are typically involved in data storing and management.

Probably the most critical issue in data availability in the current organization-centric PDE is the fact that the most valuable information remains unused in peoples' heads. Peoples' goals,

dreams, plans, priorities, preferences, constrains, circumstances cannot be derived in traditional ways from interactions and transactions. Utilizing proxies and predictive analytics is only slightly better than guesswork. (Ctrl-shift 2011, 14.)

Cost vs. benefit issue

Organizations make significant investment in developing capabilities to collect, store, combine, analyse, and utilize personal data. They are reluctant to share personal data with individuals as they fear the data would end up in the hands of competition (WEF 2012, 26). At the moment, it appears that costs and risks outweigh benefits, making organizations struggle to identify economic incentives for enabling individuals to take more control over the use of their data (WEF 2011, 8, 11).

Data quality

As soon as the data are captured, it starts to decay. This is because people's lives are constantly changing; therefore, the data captured in the past becomes inaccurate over the time. People move to new homes, get babies, get a new job, start new hobbies; their needs and preferences are changing. To maintain data quality, organizations need to make continuous investments. Otherwise they would be wasting time and money trying to utilize incorrect data. (Ctrl-shift 2011, 18.)

Besides the fact that data quality deteriorates over the time, it is often not even correct at the very beginning. Facebook is a good example of this. Mark Zuckerberg has long been advocating that people should have one identity (Foer 2017). He characterized having separate identities for work colleagues and other people, as a lack of integrity. Apparently, the company that has well explored the cavity of human nature where people would like to present themselves as something they are not, now complains about inaccuracy of the information they have effectively encouraged.

Inadequate permissions mechanisms

Permissions for data use are asked from individuals at the time of data capture, traditionally utilizing notice and consent mechanisms (WEF 2012, 23). However, data use is dynamic as it happens in different contexts. Furthermore, the future uses of data cannot be fully anticipated, some of which could generate significant value for business, individuals and society. New innovative services would require different data to be combined in new ways, could involve third party organizations, can be offered in unusual contexts, etc. Therefore, permissions also need to be dynamic requiring individuals to become active enablers of mutually beneficial

changes. To succeed, organizations need to offer easy mechanisms for managing permissions. Failing to do that is becoming unacceptable (Ctrl-shift 2011, 19). The risk is to end up not having the permissions that in turn can lead to decrease in business or possible legal issues.

Data security

As the volumes of collected personal data are rapidly growing, it is becoming more difficult to ensure data security (WEF 2012, 10). Risk increases with data sharing between organizations.

Data breaches target all companies in possession of personal data, not only first-hand collectors. For example, in 2011 the target of a massive data breach was the second-hand data holder Epsilon - the world's biggest permission-based email marketing company, which managed customer databases and email marketing for about 2,500 companies at the time. The breach exposed names and email addresses of millions of people, affecting Epsilon client companies like Best Buy, Citibank, Disney, JPMorgan Chase, Hilton, and Marriott who had to notify their customers causing an overall of $225 million in damage (Rashid 2011).

Depending on the number of records breached, the type of data in the records, the source of the breach, and how information is used, breachlevelindex.com site determines breach level severity from minimal to catastrophic. In the worst case, the breach can have immense long-term impact on breached organization, customers or partners (Stiennon 2013, 3).

3.6.3 Challenges from the perspective of governments

Governments are facing a challenge on how to stimulate innovation and growth while protecting individuals from the harmful use of their personal data. They are concerned about decline in trust individuals have towards the collection and use of their personal data by organizations and governments that is increasing the misbalance between their objectives. Different governments are taking different approaches to balance those objectives. (WTF 2012.)

There is no globally accepted view on quickly changing PDE that is becoming ever more complex. There is no global consensus on which issues related to personal data should be covered and by what legal and regulatory frameworks. Different regulators are taking different approaches adding to the already existing instability. Jurisdictional questions arise due to the global nature of data flows. Resulting fragmentation hampers the full realization of the global impact of personal data opportunities. (WEF 2011, 16.)

In the EU, the European Commission regulates personal data from the perspective of protecting fundamental rights, having data protection enshrined in the EU Charter of Fundamental

Rights. The General Data Protection Regulation (GDPR) extends current EU data protection law covering the protection of natural persons with regard to the processing of personal data and the free movement of such data (GDPR 2016). The major objective of the GDPR is to empower EU citizens to control their personal data and to simplify and unify EU regulations for international companies processing data of EU residents. The regulation was accepted on 27.4.2016 and will be effective on 25.5.2018. Allen & Overy's article (2017) summarizes the main points from GDPR and outlines instructions to companies on how to become compliant.

In the US, the Consumer Privacy Bill of Rights (WH 2012) states the right of consumers to have control over the collection and use of their personal data. In particular, it addresses rights towards individual control, transparency, respect for context, security, access and accuracy, focused collection, and accountability. The bill was created to deter Internet companies from the indiscriminate collection of personal data for targeted ads, to ensure the existence of transparent and understandable privacy policies, and to prevent hacking and leaking of personal data. As the bill is not enacted yet, it cannot be enforced.

Comparing EU and US data protection guarantees in the field of law enforcement, in his study Boehm (2015) points out that the difference originate in the constitutional protection. While in the EU data protection is guaranteed in EU primary and secondary law, constitutional protection in the US is limited. US citizens can rely on the Fourth Amendment and the Privacy Act for protection, but in the law enforcement sector, data protection rights are interpreted in favor of law enforcement and national security interests. Non-US persons are usually not included in protection. Furthermore, US law doesn't contain the majority of EU protection standards. Specifically, data sharing is fundamentally different. While in the EU data sharing with other agencies requires justification because it interferes with fundamental rights, in the US data sharing between law enforcement authorities and intelligence agencies seems to be the rule rather than exception.

3.7 Ongoing efforts

The number of initiatives and solutions including emerging new technologies and services that enable individuals to control their own data has exploded in recent years. Some of them will be mentioned in this chapter with no ambition to categorize or describe them in detail.

Personal Data Stores (also known as Personal Data Vaults, Personal Data Clouds, and Personal Data Spaces) are services that enable individuals to store, manage and share their personal data in a structured and secure way. For example, Personal Data Vaults (PDV) is based on privacy architecture that enables individuals to exercise ownership of their data (Mun 2010). Individuals upload personal data to PDV and decide what will be shared with service provid-

ers. Users of the data can make controlled data sharing decisions together with owners. Different mechanisms have been developed to improve usability. Examples include eWise's AEGIS platform for storing, managing and sharing sensitive financial data.

A study on Personal Data Stores conducted at the Cambridge University Judge Business School (Brochot 2015), commissioned by the European Commission's Directorate General for Communications Networks, Content & Technology (DG CNECT) finds that this user-centric model could offer individuals more convenient ways to exercise their privacy rights and to manage and monetize their personal data. It has potential to enable more comprehensive research and innovation and bring capabilities of big data analytics to smaller firms, opening opportunities for business growth and efficiency gains especially in public sector organizations. However, providers of data stores must attract a sufficient number of individuals and businesses for the data exchange to lift up. Unfortunately, despite of multiple strategies adopted, neither individuals nor businesses are easily attracted before the other side is in place. In the conclusion of the report, DG CNECT suggests that increasing users' trust would be crucial to support the development of Personal Data Stores.

MyData Nordic Model is an infrastructure level service for enabling individuals to control their personal data, developed by Open Knowledge Finland's My-Data working group, supported by the Helsinki Institute for Information Technology. The approach is based on MyData Account service, provided by operators that perform consent management, and MyData compliant APIs that are used to enable data flow between data sources and data users and consent flow from MyData Account. Individuals exercise control over their personal data via dashboard in MyData Account where they can grant access and control permissions for multiple data sources and data using services. Standardized architecture would enable interoperability between accounts and allow individuals to switch between MyData service operators. The approach is being developed and deployed in stages. (Poikola 2014.)

Personal Data Ecosystem Consortium (PDEC 2017) is a non-profit trade association that aims to expand person-centric PDE enabling start-up organizations to implement person-centric data logistic. It was founded in 2010 by Kaliya Young, also known as Identity Woman to facilitate the network of companies that are providing tools to individuals to collect, manage and obtain value from their personal data.

Midata is the UK government's voluntary program started in 2011 that allows consumers to download their data in standardized format from various organizations (including banks and utility providers), consumer groups and regulators. For example, information about energy consumptions would allow consumers to budget and forecast their future energy use and compare tariffs between energy providers. Transactional data from bank accounts can be

downloaded and uploaded to 3rd party price comparison web sites to compare and identify best value, suggesting how to manage accounts in the future and switch to another account provider. In their report “The new personal data landscape”, Ctrl-Shift (2011) explores the broader context of Midata (regulatory, economic/commercial, technological and social) and its implications for organizations. The report identifies trends that are transforming personal data landscape, such as new information sharing with customers, and the emerging market for personal information management services. It recommends to organizations to build trust beyond current privacy policies, build new mechanisms for win-win data sharing, and focus on creating greater value for both customers and company.

Personal Data Cooperatives (Midata.COOP) is the first citizen-owned and citizen-controlled personal data exchange platform. It presents itself as the basis for a new trust-promoting framework: citizen owned, not for profit, open source, transparent, secure and regional.

Privacy by Design (PbD) concept is built around the conviction that privacy cannot be assured solely by compliance with regulations, but needs to be embedded in the way organizations operate including their IT systems and networked infrastructure as well as their business practices (Cavoukian & Green 2012). It defines seven foundational principles that, if followed, should enable individuals to achieve privacy and obtain control over personal data and organizations to gain sustainable competitive advantage. Big Privacy takes the PbD concept further, applying it to networks, value chains, and ecosystems with the goal to ensure systemic protection and radical personal control over the use of personal data (Cavoukian & Reed 2013).

The US government has many of their own initiatives. The Blue Button initiative (https://www.va.gov/bluebutton/) releases medical records back to US Army veterans. The Green Button initiative (https://www.energy.gov/data/green-button) is an industry-led effort in response to a government initiative to provide utility customers with easy and secure access to their energy usage information, water consumption, etc. The Smart Disclosure Program (https://www.data.gov/consumer/smart-disclosure-policy) initiated in 2012 promotes greater disclosure of government collected personal data back to people, helping them to make informed choices in relation to e.g. health care, safety, and environment. The National Strategy for Trusted Identities in Cyberspace (NSTIC 2011) is another US government initiative from 2011, where people can choose among multiple identity providers, both private and public, that can issue trusted credentials that prove identity. The strategy envisions an online environment where individuals and organizations can trust each other because their digital identities are identified and authenticated. Do Not Track legislation, adopted both in the US and the EU, protects user rights not to be tracked when browsing web sites (Speier 2011; GDPR 2016).

The most significant and comprehensive EU legislation regarding personal data protection is the earlier mentioned General Data Protection Regulation (GDPR) (GDPR 2016). It gives right to EU citizens to control their personal data and regulates processing data of EU residents by international companies. An earlier example of a landmark EU regulation is “Right to be forgotten”, which enables individuals to determine their future lives free of consequences from specific past actions. This regulation is not adopted in the US.

The top technology companies Google, Apple, Facebook and Amazon, commonly called GAFA in Europe, are rather driven by the urge to explore and extend the possible potentials of personal data they have amassed, and by the privacy breach cases and pressure to comply to changing laws worldwide. Because of numerous privacy breaches and transparency issues, the trust towards most of these companies has eroded. Lacking alternatives, people are accepting it, effectively misplacing their trust. Because of trust issues and GAFA’s current business models that are in conflict with the notion of empowering individuals, their genuine interest in giving up control of personal data is questionable. It is however clear that the top technology companies are aware of these issues in PDE, and they work on exploring the possibilities of how the actors in PDE could sustainably maximize the contribution personal data makes to the economy, to society, and to individuals. One example of this effort is the study Facebook commissioned from Ctrl-Shift (Ctrl-Shift 2016). The study concludes that a sustainable personal data environment has the following characteristics:

- individuals have the feeling of confidence and fairness when using data driven services
- policy makers and regulators act united in maximizing benefits and minimizing harms
- organizations demonstrate responsibility and accountability
- solutions to concerns are human centric and effective.

The study suggests three steps to make the most impact on PDE. Firstly, commercial organizations should take a lead in improving the climate for discussion, and then together with policymakers and regulators they would need to explore new ways of realizing the value of data for all the actors in PDE. Finally, all the stakeholders “need to bring the right expertise to bear to create mechanisms of trust, transparency and control that work with the realities of mass human behavior” (Ctrl-Shift 2016, 18). Although such intent appears well aligned with MyData, we must acknowledge that the starting position of Facebook is much more inferior – they are not trustworthy.

In addition to initiatives and solutions, there is a lot of advice and recommendations regarding online behavior and handling of personal data. “Opt-out”, “unsubscribe”, “don’t use credit cards”, “be careful with social media, think of the future”, are some of many. These pieces of advice may be pragmatic in given circumstances, but they are often restricting. Following

them would lead to losing some of the benefits, rather than enhancing them. Data protection facts and suggestions can be found on Data Protection 2016 site.

Data sharing platforms and data analytic services are existing general technological enablers of the solutions addressing personal data handling. What was once affordable only to the largest organizations in terms of information processing power and storage is now available to private individuals. For developing the concept of MyData service, their detailed analysis is not relevant.

4 Modified preliminary concept

The preliminary concept was modified based on the literature analysis. However, the literature review above covers the whole literature study done during the whole period of the research. See Figure 17: Research process.

4.1 Journey vs. destination

The conviction to pursue the idea of MyData was quite fragile at the beginning. The “idea” refers to a concept of a service called MyData that enables individuals to own their personal data. “Is the idea worth of pursuing?” was the question dominating the early phase. Other than having believes and feelings about it, one could not have known the answer at the beginning of the journey.

One of the challenges of answering this question was understanding the actual problem the solution was addressing. Defining the underlying problem confronts designer with a fundamental issue in design thinking, the indeterminacy of design problems. More research pointed not only to one, but many underlying problems, only increasing the complexity of the issues needed to be considered. Every problem seemed to lead to another one. Studying different actors involved with the creation and use of personal data suggested that the ecosystem approach would be appropriate for understanding their interaction and relationships. From this perspective, the misbalance of the personal data ecosystem was identified as the underlying problem. However, the attempts to define it clearly pointed out its indeterminate nature, demonstrating that the choice of explanation determines the nature of the problem's resolution. Multiple actors had conflicting and changing needs and values which were difficult to recognize and define. Further research and development of the concept attempted to reposition identified problems and issues in connection to other problems, the problem of defining identity in merging real and digital world, and the problem of preserving humanity while harnessing technology innovations in the future, to mention some of the key ones.

The problem was undoubtedly wicked. It became clear that the process of designing the solution cannot be linear. Furthermore, because of the uniqueness of the context in which the design process is applied, the process itself needed to be designed and suitable tools selected and applied. The journey of designing the process and testing it together with evolving the concept of the solution became a clear goal. Suddenly, the question whether the idea was worth pursuing became less relevant. A new question replaced the initial one: “Is this journey worth of taking?” This time it was easy to answer and the answer was clear: “Yes”.

4.2 Changes to initial concept

The early phase was the phase of exploring not only problems and issues, but also defining the design process to carry out the further development of the concept. The outcome of the process design is explained in paragraph 5.2.

The initial problem statement was formulated as “Misbalance of existing decentralized personal data ecosystem”, and accompanied with collected sets of issues reflecting views of all actors in current circumstances. Further exploration and development of the MyData concept is set to be taken from the perspective of people centric PDE based on MyData service.

At this point, the concept was not directly changed to the next incremental version. Rather, some key findings were formulated and some principles derived that would be guiding the development of the concept. In the following sections key findings are listed with explanations on how they directed further concept development. Derived principles are summarized as building blocks of MyData in chapter 6.2.1.

4.2.1 Trust is the key

As pointed out by multiple sources, misplaced trust is in the heart of the problem of misbalanced PDE (WEF 2012; WEF 2011; WH 2014; BCG 2012a; Ctrl-shift 2011, 18; Reding 2012). Therefore, the solution must be designed for trust. The process and outcome of every activity in designing, developing, implementing and operating MyData service must be conceived to ensure trust among all the actors.

None of existing organizations, neither from business nor from governments, are trustworthy to the level required to carry out the development of MyData. This is because of the existing plethora of issues that resulted in broken trust between main actors, individuals, organizations and governments (WEF 2012). A new type of approach resulting in a new type of organization would be required to deliver MyData service. Some concepts on how to develop and govern MyData has been explored.

Peer production (or P2P production) is where individuals voluntarily engage in self-organizing communities to produce products and services (Benkler & Nissenbaum 2016). Individuals decide what task to perform, how much time to spend on it, when and where. Collaborative capabilities available on the Internet are used to ensure coordination. Resulting products and services are free for use by anybody according to their needs, regardless of their contribution. Examples include open source software (e.g. Linux, Wikipedia) and open source hardware (e.g. open source solar powered 3D printers).

Participatory governance involves ordinary citizens engaged based on distinct practices and rules in collective decision-making activities determining public service or political outcomes in their communities (Johnson 2013).

Recent advances in technology have led to new possibilities for decentralized governance and establishing trust. Blockchain is a new technology that allows digital information to be distributed but not copied (BlockGeeks 2017). Information is publicly hosted and continually reconciled on millions of computers simultaneously. No centralized version of the information exists. Therefore, it cannot be corrupted. Originally conceived for the digital currency bitcoin, it is now finding other potential uses, including shared economy, crowdfunding, governance, identity management, and many more. Being inherently resistant to the modification of the data, blockchain enables systematic cooperation in completely distributed and decentralized manner serving as the foundation for establishing trust (Figure 8). As such, it can be utilized as a hyper political and global governance tool that could replace traditional central authorities. (BlockGeeks 2017).

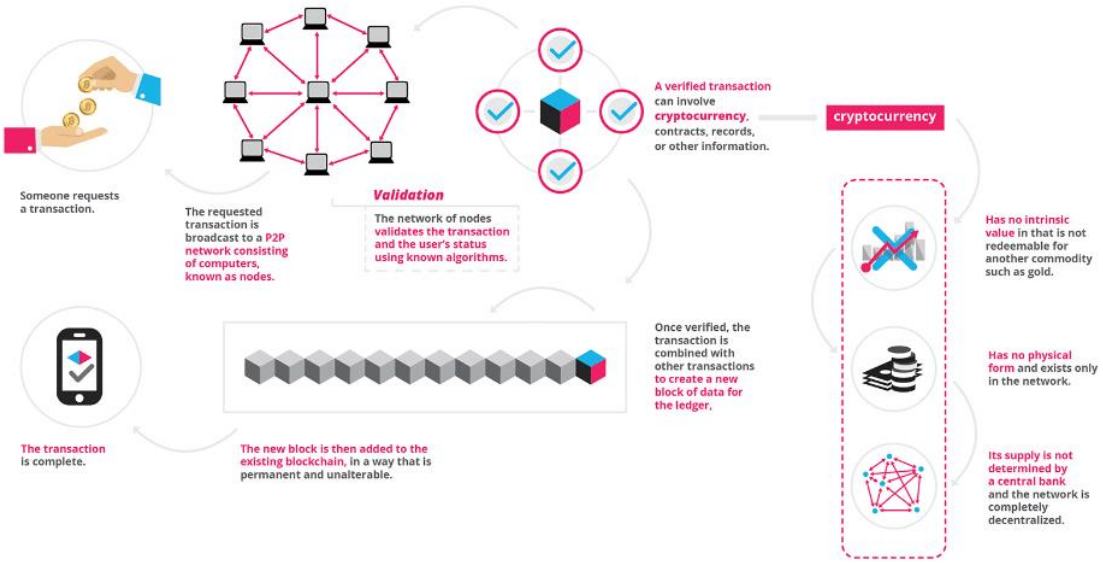

Figure 8: Blockchain explained. (Source: BlockGeeks 2017)

4.2.2 Target: Balanced PDE

To become sustainable, PDE needs to be balanced. PDE is balanced when the interests of all the actors - individuals, organizations, and governments are balanced. This is achieved when competing rights are balanced with potential risks of harming others and with the value created and captured (WEF 2012, 20). For the thesis, this is used as a working definition of balanced PDE.

Considering characteristics of wicked problems, described under the heading 3.2 Design thinking and wicked problems, we can conclude that the balancing of PDE is a wicked problem. Balance of rights, risks and value cannot be precisely quantified to help distinguishing the "right" solution that could achieve it. Therefore, we need to accept that solutions being developed cannot be true or false, but only better or worse.

Consequently, the success of MyData in balancing PDE can be measured only relatively against other solutions in terms of solving issues and increasing value for all actors. Initial understanding of pains, gains, and jobs was obtained from literature for all three actor types.

4.2.3 Scope

The literature research includes all the actors in PDE – individuals, organizations and governments. However, governments were excluded from the empirical study to reduce the complexity of the study. The reasoning behind this decision to restrict the scope is discussed in more details in section 5.2.4 Application of Value Proposition Design in this research. As a result, the scope has been limited on balancing PDE between individuals, organizations and MyData. Furthermore, implementation of the concept is also out of scope as it would require enormous resources, as well as the development and evolution of the business model.

4.2.4 Context

The service concept needs to be designed in the context of value network (service ecosystem). Value network refers to the dynamic structure of actors and their relationships and interactions in co-producing and exchanging service offerings and co-creating value (Lusch at al. 2010). Value network is based on relationships between actors. Dialog among them should be based on trust. New ideas are tested with customers who are being the judge of success. MyData is a hub in PDE value network.

4.2.5 Technology

At an early phase it became clear from direct contacts with experts that the challenge is not a technical one, but it lies in developing the concept. Technology is already developed enough to support the concept. Therefore, technology considerations were largely removed from the concept.

4.3 Concept of Identity

There are many contexts in which identity can be defined, including philosophical, social, religious, mathematical, business, digital contexts. In the context of privacy and human values, identity refers to the sense of self that individuals develop during their lives, enabling them to develop an 'own' personality and to act as a moral and legal agent. In the digital world, identity is a set of attributes related to an entity or being, a person, an organization, an application or a device (ISO 2011). In relation to human identity, digital identity refers to data related to individual persons stored in digital form. In a merging physical and digital world, the redefinition of identity becomes critically important. All these aspects of identity are explained in Wikipedia.

The idea of digital identity has been evolving for couple of decades now. Cameron (2005) has defined laws of identity offering the missing identity layer to Internet. Allen (2016) describes the evolution of digital identity starting from centralized identities, evolving through federated identities, user-centric identities to self-sovereign identities. The principles of digital identity are still being discussed. What digital identity exactly is and what it should be, what rules it should recognize, are still not well-known. MyData can offer a solution.

5 Empirical research method

The author of this thesis believes an entrepreneur with an exciting idea about a new service has no single comprehensive methodology to rely on to maximize chances for success. Conceptualizing radical service innovation becomes a search for both - the 'final' concept with a proof of its relevance, and the methodology to achieve it. Because of the uniqueness of the context in which the service is being concepted and created, the first step in the process of service design should be designing the process itself (Stickdorn & Schneider 2011, 117). The search for research methodology and process become the design problem itself.

5.1 Research approach

The concepts explained in this section have motivated the design of the research process.

5.1.1 Constructive research (strategic approach)

As the product of this research is MyData Service Concept, it was quite clear from the beginning that, strategically, the research should be based on constructive research approach (Kasanen 1993). In constructive research we develop innovative constructions intended to solve an explicit problem from the real world and to make contribution to theory of the discipline in which it is applied. MyData Service Concept is a construction that remains on the level of principal solution since its practical usability cannot be demonstrated in short term due to its complexity and the required resources. However, it is possible to separate evaluation of validity or relevance of a construct ex-ante (how the implementation is supposed to work), from ex-post evaluation (actual outcomes and the academic research contribution) as pointed out by Jönsson and Lukka (2005). The thesis therefore evaluates relevance of the proposed service concept ex-ante and also suggests how the implementation can be carried out. Although there may be multiple perspectives on relevance as argued by Rautiainen at al. (2014), no additional ones will be evaluated in this thesis.

5.1.2 Constructive controversy procedure (tactical level)

The goal of the thesis was to deal with a highly challenging, wicked problem that involves difficult issues on which agreement may not be possible. To address the challenge at a tactical level, constructive controversy procedure has been naturally adopted throughout the course of the research. Constructive controversy procedure starts from participants assuming initial judgement and presenting their ideas to others, then being challenged with opposite views causing them to become uncertain about the correctness of their views and actively

search for additional information and improved understanding, then incorporating others' perspectives in their views and finally reaching new conclusions (Johnson 2008). Among many other positive outcomes, this process results in accelerated learning and a significant increase in the quality of problem solving.

5.1.3 Design thinking and process models

MyData service is people centered, thus the approach for developing the service concept naturally needs to be also people-centric.

Design thinking is a human-centric approach that integrates people's needs with possibilities of technology and requirements for business success (Brown 2009). Although started solely as the cognitive process of designers focused on exploring design creativity, Design Thinking has evolved today to a complex thinking process of designing new realities, introducing design culture and its methods into fields such as business innovation. It offers new models of processes and toolkits which help to improve, accelerate, and visualize every creative process. It is carried out not only by designers, but in multidisciplinary teams in any kind of organization. As a result, Design Thinking is currently more explored in the fields of management and marketing than in design.

Several process models of Design Thinking were developed with the purpose of making design processes more explicit and accessible, so that they can be easily understood and applied in businesses and organizations. Some of the processes are especially created for service design like the Service Design Thinking Process (Stickdorn 2011) while most of them are general design thinking process models used to produce a variety of outcomes including new or improved service.

Developed by IDEO in 2001, the 3 I model (Brown & Wyatt 2010) describes Design Thinking process as a non-linear exploratory process, best thought of as a system of overlapping spaces rather than a sequence of orderly steps. Those spaces are inspiration, ideation, and implementation (Figure 9**Error! Reference source not found.**). Inspiration is about finding the problem or opportunity that motivates the search for solutions; Ideation is the process of generating, developing, and testing ideas; and Implementation is the path that leads from the project stage into people's lives. The reason to call these spaces, rather than steps, is that they are not necessarily undertaken sequentially. Projects may loop back through inspiration, ideation, and implementation more than once as the team refines its ideas and explores new directions.

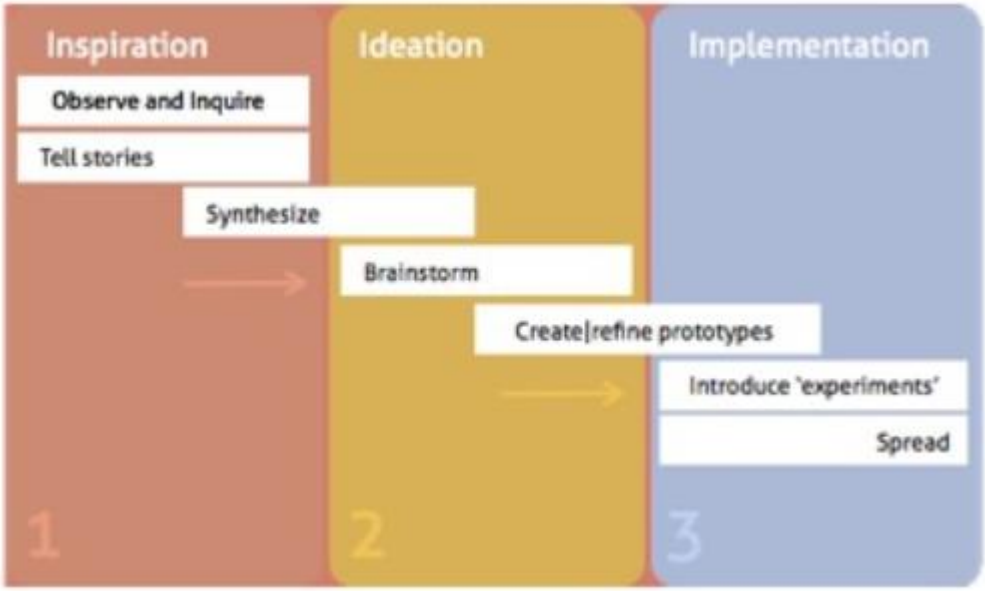

Figure 9: IDEO's 3 I Design Thinking model. (Source: Tschimmel 2012, 6)

Another IDEO's model Human-Centered Design (HCD) was developed on the request of the Bill & Melinda Gates Foundation to help non-governmental organizations working with impoverished communities in the developing world (Brown & Wyatt 2010). HCD defines another three spaces designers considered critical for human-centered design process: hearing, creating, delivering (Figure 10). During the Hear phase, the design team will conduct a field research to collect stories and inspiration from people. In the Create phase, the team will work together in a workshop format to translate what has been heard from people into frameworks, opportunities, solutions, and prototypes. Thinking will change from concrete to more abstract in identifying themes and opportunities, and then go back to the concrete again with solutions and prototypes. In the Deliver phase, realization of solutions through rapid revenue and cost modeling, capability assessment, and implementation planning, is taking place. It enables launching new solutions into the world.

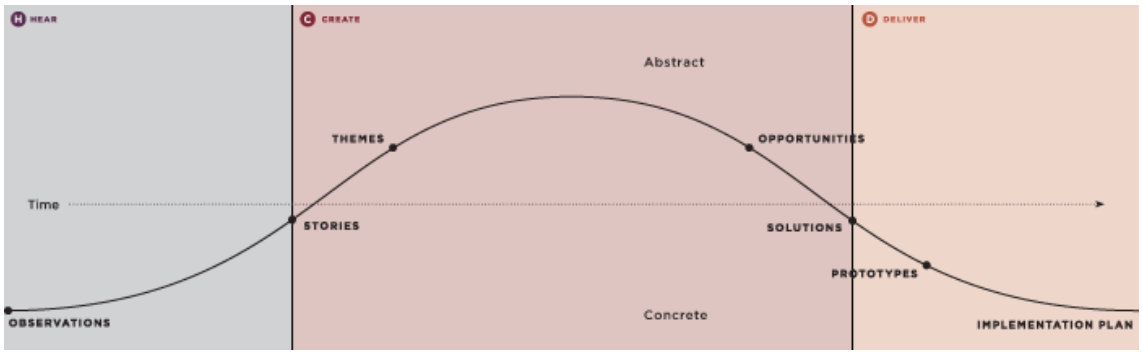

Figure 10: Phases of HCD. (Source adopted http://www.hcdconnect.org/toolkit/en, accessed 18 Apr 2014)

Another model, inspired by IDEO's 3 I model, is the Design Thinking model of the Hasso-Plattner-Institute (HPI) from the University of Potsdam, Germany. It defines its design thinking process as a human-centered set of methods and tools that combines approaches from design, ethnography, technology and business to deliver life enriching experiences in any form, such as products, services, processes, events and even policies. The process is visualized with six steps with its non-sequential nature emphasized with loops going back to earlier stages (Figure 11). The Understand phase is about learning by talking to experts and through research. The next phase is about observing people's interaction in physical places and spaces, interviewing and reflecting in order to develop understanding and sense of empathy. Particular attention in the overall process is paid to the Point of View step in which emphasis is placed on direct interaction with the future user of the solution to develop insights and understand people's needs. This phase ends with a suggestion about how to make changes that will have an impact on peoples' experiences. Ideating, critical component of design thinking, is the phase where brainstorming a myriad ideas takes place. Quantity is encouraged, judgment is suspended. Prototyping is enabling to convey an idea quickly, fail early and often in order to obtain better outcome in the end. Testing provides understanding what works and what doesn't and iterate.

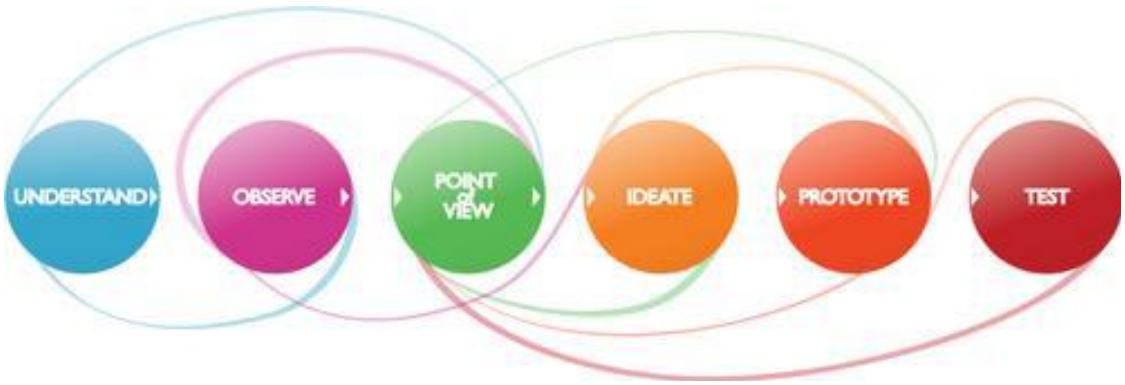

Figure 11: The Design Thinking Model of the Hasso-Plattner-Institute. (Source: https://hpi-academy.de/en/design-thinking/what-is-design-thinking.html, accessed 18 Nov 2017)

In cooperation with HPI, d.school at Stanford developed a similar process that consists of five phases: empathize, define, ideate, prototype, test (Figure 12). Empathy is considered the foundation of human-centered design processes. In this phase we observe, engage and immerse to build empathy for the users, to learn who they are and what is important to them. Define phase has two goals: to develop a deep understanding of users and design space, and to come up with actionable problem statement – point of view. Process then continues through Ideate, Prototype and Test stages as they are similar to those from HPI.

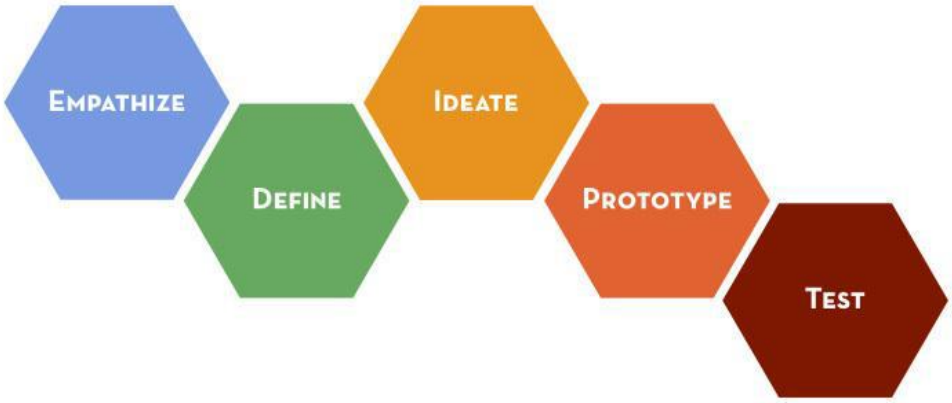

Figure 12: The Design Thinking Model of the d.school at Stanford. (Source: https://dschool-old.stanford.edu/sandbox/groups/designresources/wiki/36873/attachments/74b3d/ModeGuideBOOTCAMP2010L.pdf, accessed 18 Nov 2017)

Another widely used model is the Double Diamond design process model which was developed by the British Design Council as a result of an in-house research in 2005. In this model, the design process is divided into four phases: discover, define, develop and deliver. Its characteristic double diamond shape visually depicts the divergent and convergent nature of different modes of thinking designers use in different phases of the process (Figure 13).

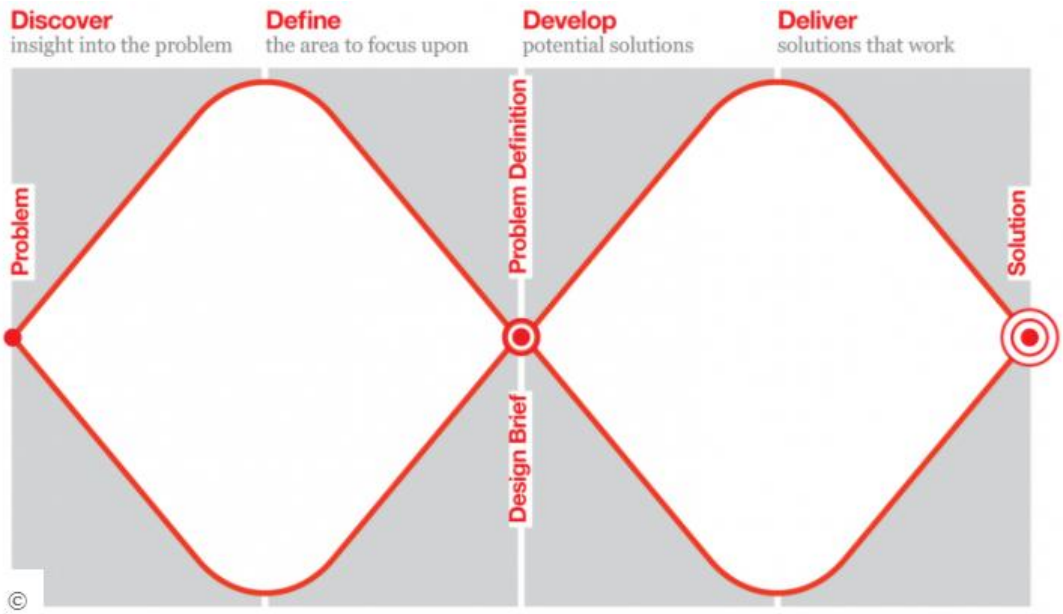

Figure 13: Double Diamond Design Process Model. (Source: http://www.designcouncil.org.uk/news-opinion/design-process-what-double-diamond, accessed 18 Nov 2017)

The discover phase is where the project starts. Designers are searching for the new opportunities obtaining new information, insights and trends in an attempt to look at the world in a new, fresh way, seeking for inspiration. Market research, User research, Managing and planning and Design research groups are the methods used in this phase. In the Define stage, the designers try to make sense of the opportunities identified in the Discover phase. Insights are analyzed and decisions are made on what is the most important issue to start with, resulting in a creative brief that defines the design challenge. Project planning and sign-off are taking place in this phase. Develop is the stage where solutions are iteratively created, prototyped and tested. This is where the ideas are refined and improved through series of trials and errors. The specific methods and objectives characteristic of this phase are brainstorming, prototyping, multi-disciplinary working, visual management, development methods and testing. Deliver is the final stage, where the resulting product or service is finalized and launched. Final testing, approval and launch, evaluation and feedback loops are characteristic for this phase.

The Service Design Thinking (SDT) Process is the service design process proposed by Stickdorn & Schneider (2011). It consists of four interactive stages: exploration, creation, reflection and implementation (Figure 14). It is an iterative process that underlines the non-linear nature of service design. Iterations occur not only between the stages but also inside each one of them.

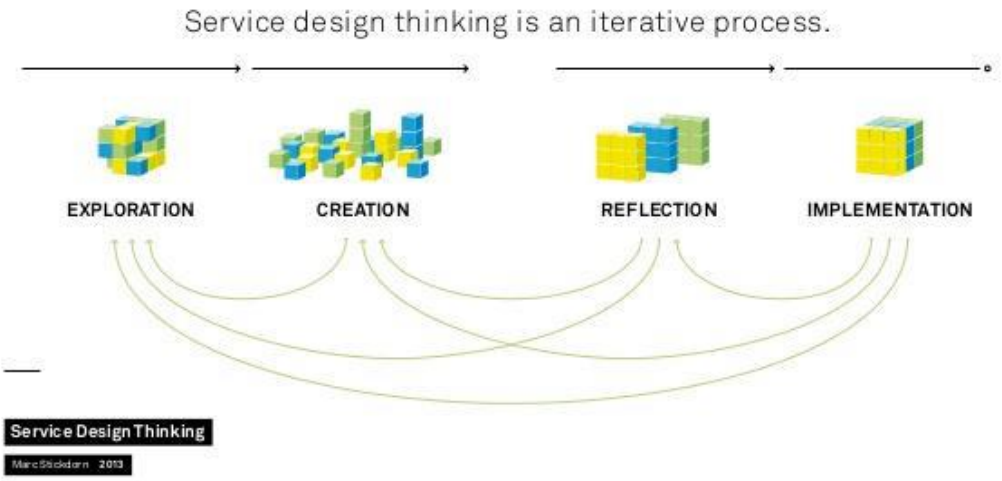

Figure 14: Service Design Thinking Process. (Source: Stickdorn & Schneider 2011, 115)

The exploration stage is about understanding the situation from the perspective of the service provider and the customers of the service. The first task of a service designer is to understand the culture and goals of the company providing the service and the problem from their point

of view. The second task is to identify the real problem from the perspective of the current and potential customers. And the third one is to visualize findings about the context of the service. The creation stage is about the concept design. Based on identified problems and insights from the exploration stage, ideas and concepts are iteratively produced, tested and retested. Work is done in an interdisciplinary team that includes stakeholders. Exploring rather than avoiding mistake is important in this phase. In the reflection stage, building prototypes to test ideas and concepts from the previous stage is where the most iteration occurs. Prototyping of service concepts should be done in reality or in circumstances close to reality. Change management plays a key role in implementation. Communicating and testing the new concept, improving the prototype with the contribution of employees is ideally continuing with another exploration to evaluate the progress.

The summary of the described Design Thinking process models is given in Figure 15. Reducing design thinking process to a couple of spaces or steps is clearly inaccurate, but the advantage of these models is that they are making Design Thinking processes more understandable, applicable and comparable.

Double Diamond (British Design Council)	SDT Model (Stickdorn)	HPI Hasso-Plattner Institute	d.school HPI at Stanford	3I Model (IDEO)	HCD Model (IDEO)
Discover	Exploration	Understand	Empathize	Inspiration	Hear
		Observe			
Define		Point of View	Define		Create
Develop	Creation	Ideate	Ideate	Ideation	
	Reflection	Prototype	Prototype	Implementation	Deliver
Deliver	Implementation	Test	Test		

Figure 15: Summary of selected Design Thinking processes

5.1.3.1 The choice of the model

When choosing the appropriate Design Thinking process model at least the following elements need to be considered: the specifics of the innovation task, its context, available resources human and nonhuman (e.g. financial resources, technology, etc.), and the time available for the innovation process.

The model of choice for this thesis is the Service Design Thinking (SDT) model. Among the models presented above, it is the only model specifically developed for service design and, according to Tschimmel (2012), it is the most appropriate method for guiding innovation in the service area. The authors of the model, Stickdorn and Schneider point out that the first step in the process of service design should be designing the process itself. This is because each service design project addresses a unique context in which the service is being created, therefore each design project requires a unique process.

5.1.4 Lean Startup

There is quite a wide spectrum of service innovation methods in existence. On the one end of the spectrum, needs-first methods start from capturing customer needs and then formulate the innovative service concept to satisfy customer's unmet needs (Bettencourt 2010; Ulwick 2013). Here, ideation is part of the process and solutions are generated in the process. On the other end, idea-first approaches are based on the belief that all innovation begins with creative ideas (Amabile at al. 1996). Speed is important in executing this approach – "failing fast", so that the best ideas are revealed faster, with less expenses. Lean Startup methodology fails in the second group. Here, ideation is not part of the process, the product-service vision is provided by company founders (Blank 2013, 5-6).

Lean is judged by its ability to solve customer problems cost effectively. In other words, lean is about creating more value for customers with fewer resources, i.e. minimized waste (Womack & Jones 1996, 15). As a result, lean organizations understand customer value and focus their key resources on increasing it continuously. (LEI 2018.)

Lean Startup is a relatively new methodology aiming to make a process of starting new company less risky. The primary task for startups is to search for business models. This is completely different from executing the model used by established companies. Lean Startup methodology favors experimentation over elaborate planning, customer feedback over intuition and iterative design over development with big design upfront. (Blank 2013.)

Companies are seeking new approaches that would help them to innovate rapidly and transform their business. Utilizing Lean Startup is one specific example. Similarly, startups are adopting some design thinking methods. The trend of converging innovation methods can be observed. For example, Lean Design Thinking is the model that adapts and merges aspects of both Design Thinking and Lean Startup innovation strategies (Mueller & Thoring 2012).

5.2 Research process

5.2.1 Process overview

The process of developing MyData service concept (Figure 16) started with an idea described in the preliminary concept. The idea came from the researcher's pre-understanding and also from his sensibility towards issues with personal data and emerging solution directions. Further studies of available literature led to a modified preliminary concept. Both have provided an input for planning the research as far as the choice of the research approach and research process concerned. The final concept was constructed based on the research results and on the additional literature analysis.

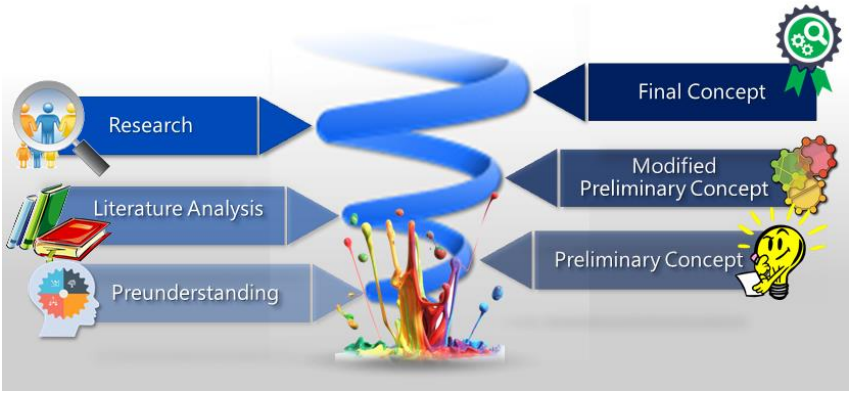

Figure 16: Process of development of MyData service concept

5.2.2 Research process

The research process undertaken to develop MyData Service Concept is depicted on Figure 17. It consists of two phases: Exploration and Creation. These phases correspond to the first two stages from Service Design Thinking process. The other two phases of the SDT process, Reflection and Implementation, were omitted from the scope of this thesis.

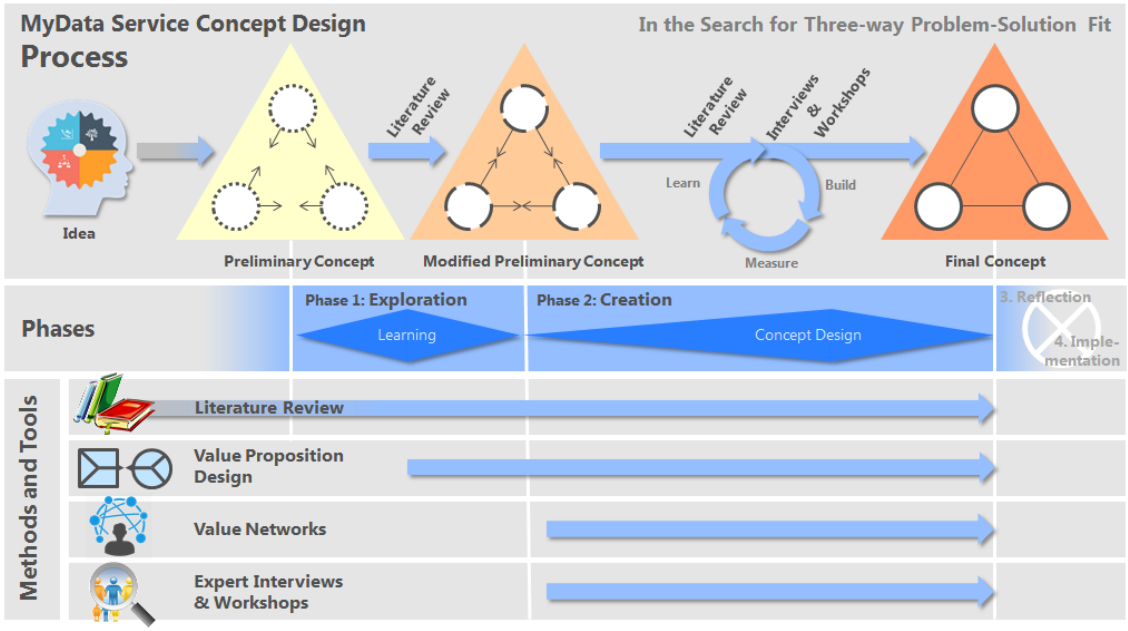

Figure 17: Research process

The starting point of Exploration phase was the original idea of MyData service described in the Preliminary Concept. The exploration phase had two major goals. The first goal was to obtain a detailed understanding of the situation related to the use of personal data from the perspective of key actors in the PDE, including their needs and problems, as well as the context in which personal data is used. As a result, the Preliminary Concept can be developed to form the Modified Preliminary Concept. The second goal was to design the service design process itself that would help to develop the MyData service concept towards the 'final' concept.

In practice this means that at the beginning of the process the initial idea was questioned and with the help of literature study an attempt was made to understand the underlying problem better and assess the feasibility of the proposed solution. At the beginning of the process, the researcher faced the following recurring questions: "Is this idea worth perusing further?" and "How to evaluate whether it could work?" This phase can be described by both the search for the proof of the viability of the idea and the search for the appropriate research method that could help improve the concept and confirm the viability of the idea. It became clear very early that any implementation or prototyping would be outside the scope and possibilities of this research because of the enormous complexity of the solution and the lack of resources. Even more importantly, finding a way to implement the concept is neither easy nor clear. I have quickly learned that the fundamental issue MyData concept is actually attempting to solve is the delicate problem of trust.

Besides the need to design the concept keeping the issue of trust in mind, its implementation should also be approached in a new innovative way. Designing an implementation process for trust is a design problem on its own. The lack of convincing proof that the concept can be implemented in trusted ways could undermine the concept itself. Therefore, the concept had to outline the implementation approach. The full design of the implementation process would significantly add to the complexity of the research that is why it is outside the scope of the thesis. The idea was to develop a concept and open it for the public to encourage engagement in the process of implementation. Therefore, the goal became to develop and evaluate the idea in theory in order to motivate engagement.

The outcome of the Exploration phase was the formulation of the solution to the problem of the "Misbalance of existing decentralized Personal Data Ecosystem" outlining the solution direction as "People centric Personal Data Ecosystem based on MyData Service". As expected, the feasibility could not be assessed based on the literature only, therefore the choice of the appropriate process for evolving and proofing the initial concept became critical.

The newly published Osterwalder's Value Proposition Design (2014) has surfaced as a process of choice for designing the value proposition of MyData Service, i.e. creating the MyData Service Concept. As a result, the Preliminary Concept, enriched with the findings from literature, was modified to adopt the terms of Value Proposition Design. At that point, it become apparent that the way to iterate towards the final concept was to search for a problem-solution fit between the reduced number of actors in PDE: individuals, organizations and MyData.

5.2.3 Value Proposition Design

This chapter outlines the value proposition design process as described in the book Value Proposition Design (Osterwalder 2014) and explains how it is applied in this thesis. This approach is considered appropriate because it is built around a practical tool for conceptualizing and iterating a new value proposition which is the key task of this thesis.

Value proposition design is the process of designing, building, testing, and managing value propositions throughout their lifecycles. Value proposition portrays the benefits customers can expect from the product and service offering. Value proposition design process, as described in the book, is applicable for inventing new value propositions, as it is the case in this thesis, but also for improving existing ones. The tool used in value proposition design is Value Proposition Canvas (Figure 18). It consists of two critical building blocks from Business Model Canvas (Figure 19) Customer Segment (Profile) and Value Proposition (Map). The purpose of the Customer Profile is to help obtain clear customer understanding, while Value Map is used

to describe the offering and how it is supposed to create value for the customer. The process of value proposition design is essentially a search for a fit between the Value Map and the Customer Profile.

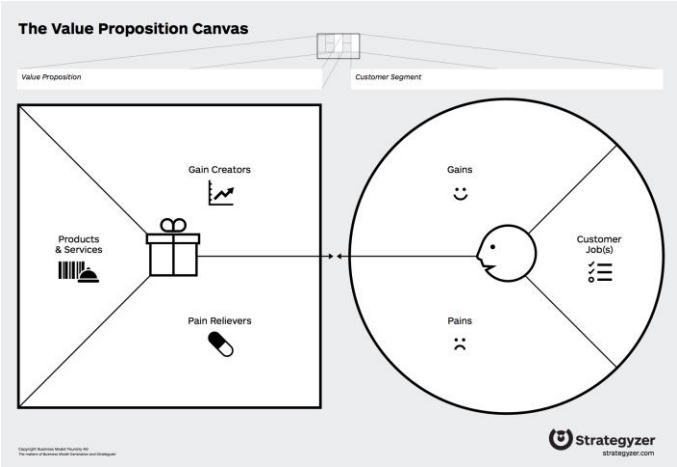

Figure 18: Value Proposition Canvas. (Source: Osterwalder 2014, 61)

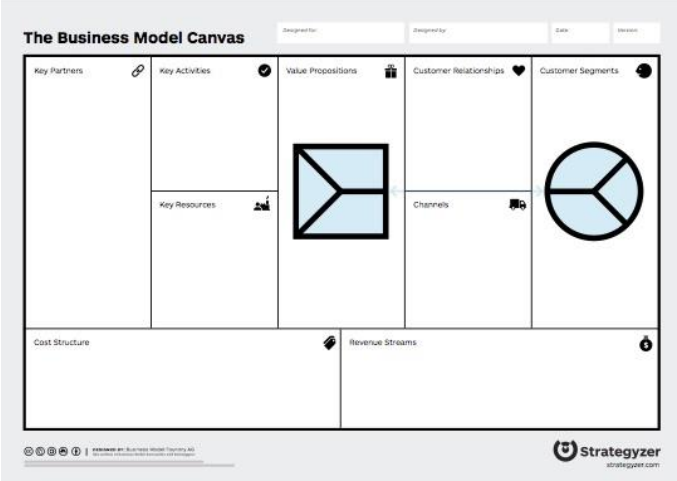

Figure 19: Business Model Canvas. (Source: Osterwalder 2014, XVII)

The Customer Profile describes a specific customer segment from the business model in a structured way, breaking it down to customer jobs, pains, and gains. Customer jobs are describing what customers are trying to get done in their work and lives. Those can be tasks they are trying to perform, problems they trying to solve, or needs they are trying to satisfy. The main types of customer jobs are functional, social, and personal/emotional jobs. Pains are anything that annoys customers before, during, and after trying to get their jobs done, or preventing them to get the job done. Pains include undesired outcomes (functional and emotional), problems and characteristics, as well as obstacles and risks. Customer gains describe what customer wants in terms of outcomes and benefits. Gains can be required, expected, desired, and unexpected.

The Value Map is a set of value proposition, features or benefits, being designed to attract customers. It specifies the actual offer around which products and services value proposition is built, and describes how the offer provides pain relievers and gain creators.

The Customer Profile and the Value Map fit when the customer acknowledges that the value proposition addresses important jobs, relieves the hardest pains and provides critical gains the customer cares about. Three kinds of fits need to be achieved throughout the lifecycle of the organization. These are: 1) problem-solution fit, 2) product-market fit, and 3) business model fit.

Problem-solution fit is achieved when: a) the evidence is obtained that customers care about certain jobs, pains, and gains; b) a value proposition is designed that addresses those jobs, pains and gains. In other words, problem-solution fit is focused on learning about customers, making sure that their real problems or needs are uncovered and understood, and value proposition shaped accordingly. In this phase, value proposition is rather conceptual, i.e. fit is achieved in theory.

Product-market fit is about obtaining evidence that evolving products and services are actually creating value for customers thus getting traction in the market. Finally, business model fit is achieved by obtaining evidence that a profitable and scalable business model can be built around a given value proposition.

Value proposition design can start from many points, and not necessarily from customers, but it must end up addressing jobs, pains, and gains that customers care about. Two common but opposite approaches are the (technology) push and the (market) pull approach. In the push approach, the starting point of the value proposition is the solution that can include technology or innovation. The search for fit then means learning about customers, i.e. finding a problem the solution is addressing. The pull approach progresses in the opposite direction, it starts with understanding customers and continues with a search for viable solutions. In either case, prototyping is used as an aid for turning ideas into value proposition. The design process is therefore a continuous cycle of prototyping, researching customers and reshaping ideas.

There are some business models that combine different value propositions for different customer segments, for example intermediary and platform business models. In these cases, multiple fits need to be achieved between the value propositions and customer segments.

Strategy Canvas elaborated in the Blue Ocean Strategy book (Kim 2005) can be used as a visual tool for comparing value proposition with completion to understand how to differentiate.

5.2.4 Application of Value Proposition Design in this research

In this thesis, value proposition design is applied for finding problem-solution fit only. This resulted in an improved service concept based on improved customer understanding. However, from the perspective of MyData service, there are different customer segments involved.

MyData Service Concept is essentially a platform model that connects multiple actors from the personal data ecosystem with a specific value proposition for each. The three major actors (customer segments) addressed in the concept are individuals, business organizations, and governments including public organizations. Although value propositions are described for each one of them, problem solution fit is iterated only for individuals and business organizations in order to reduce complexity and achieve the objective of the thesis within the given constraints of time and resources. As a result, the challenge became to achieve a three-way problem-solutions fit (Figure 20), which includes the following: MyData value proposition fit to Individuals, MyData value proposition fit to Organizations, and Organization value proposition fit to Individuals supported with MyData service.

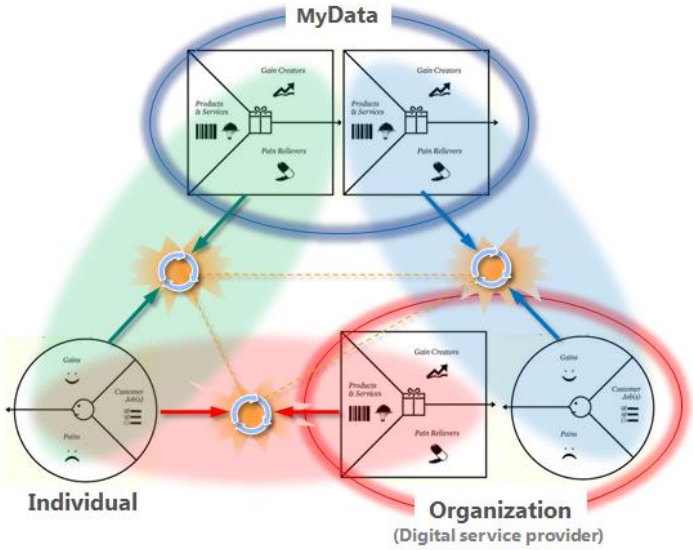

Figure 20: Three-way problem-solution fit

The inclusion of Governments and the public sector would add additional dimensions and the challenge would turn to a six-way problem-solutions fit (Figure 21). Due to the magnitude of such challenge, governments and the public sector is excluded from the scope of the empirical study.

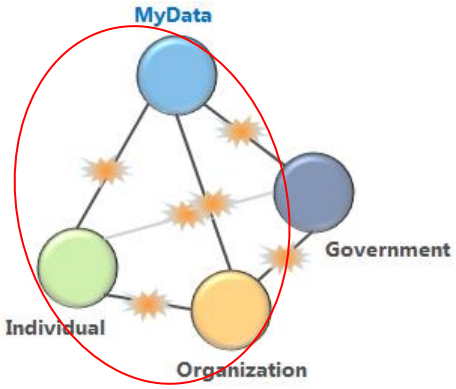

Figure 21: Six-way problem-solution fit. MyData, Individual and Organization are in the scope.

Each fit was iterated through the Lean Startup cycle: build, measure, learn (Figure 22). As the starting point of the process was the preliminary concept of MyData, the solution push approach was used. This is also referred to as the 'technology push' approach (Osterwalder 2014, 94). The value proposition, which addresses customers' jobs, pains, and gains, was developed for MyData at the conceptual level. Conceptual prototypes were explored with selected customer segments to share ideas, map, and track and iterate to find out what could work and to identify which hypotheses need to be true in order to succeed. The information gained through this process helped to find out what needed to change in the conceptual prototypes and why. This phase was carried out through interviews and workshops that were conducted to test the initial value proposition including assumptions made in conceptual prototyping. The measure in this process was related to the actual outcome of the experiments conducted through interviews and workshops versus what was expected to happen, i.e. the original hypotheses.

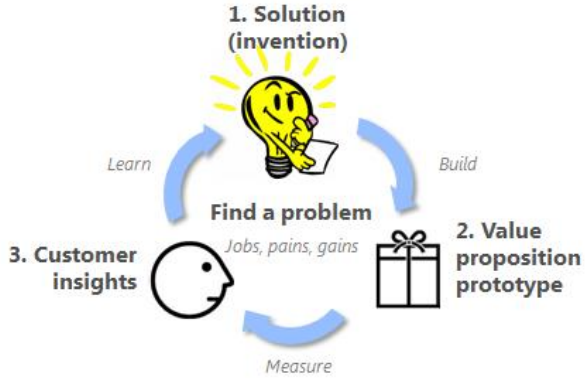

Figure 22: Build, Measure, Learn cycle in solution push case. (Source: Adopted Osterwalder 2014, 94)

Developing and iterating a business model in full extent is outside the scope of the thesis. Only the critical elements and assumptions of the business model are outlined and tested here to provide evidence that a sustainable business model can be built around a given value proposition.

5.3 Value Network Map

Value Network is a set of roles, carried by individuals, groups or organizations, and their interactions and relationships that generate tangible and intangible economic or social value through complex dynamic exchanges. Any purposeful organization or activity in the private or public sector can be understood as a value network. (Allee 2002.)

This thesis adopts a simplified form of Value Network Map that defines roles in personal data ecosystems and maps value flows between them as flow of data. It is inspired by the example of the map of Flow of Data in Current Ecosystem around Targeted Advertising and Data Aggregation developed by Verna Allee of Value Network LLC, in collaboration with the Personal Data Ecosystem Consortium (Figure 23) (WEF 2012, 32).

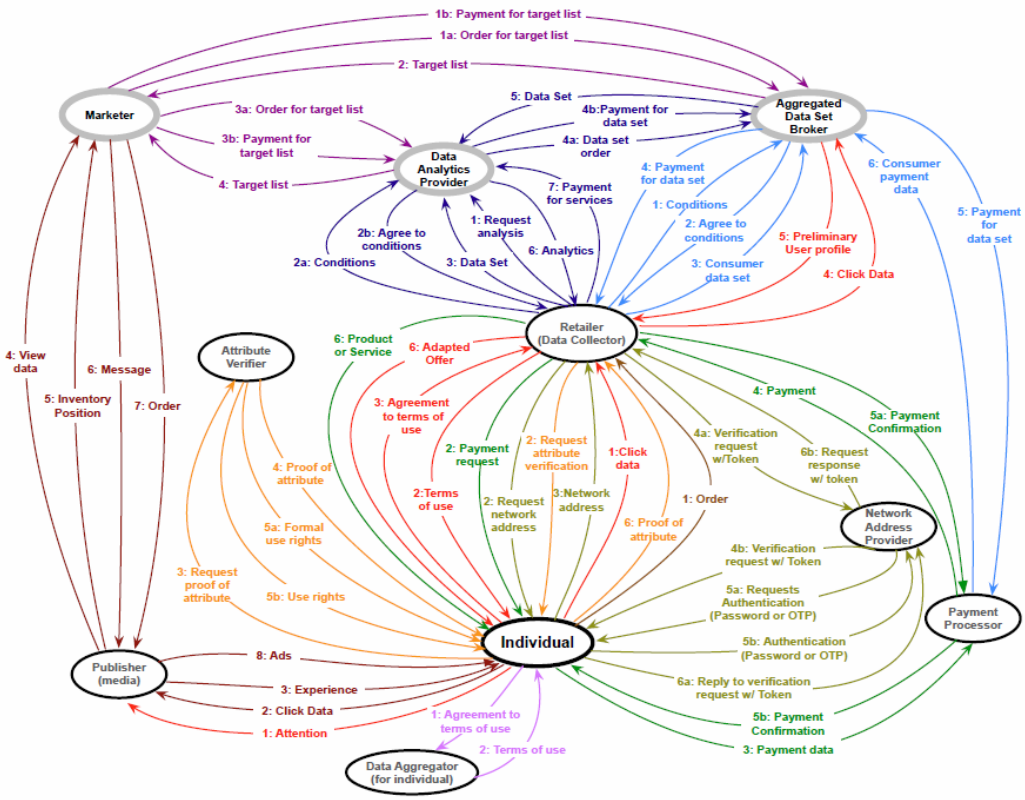

Figure 23: Flow of data in current PDE around targeted advertising and data aggregation. (Source: WEF 2012, 32)

The Value Network modeling approach is focused on the exchange of value, rather than on value co-creation, as pointed out by Weigand (2009). As suggested in the same paper, for the modeling and analyzing of value co-creation, a modified approach like Value Encounters may be more appropriate. However, in this thesis, Value Network Map is used in the value proposi-

tion design process where the focus is on iterating a service concept in search for a problem-solution fit, rather than modeling the value itself. Because of its simplicity and applicability, the Value Network Map is considered appropriate despite its obvious limitations.

The Value Network Map is used as a tool in expert interviews to:

- Draw data flow between the case organization and selected actors according to the current business model, and map key jobs, pains and gains;
- Redraw data flow adopting MyData concept, map key jobs, pains and gains;
- Analyze how jobs, pains and gains are changing, and capture new ideas and improvements to existing MyData concept.

5.4 Expert interviews

5.4.1 Principles of expert interviews

Expert interview is a specific form of qualitative empirical research aimed at exploring expert knowledge. Although it is in the researcher's discretion to set the research objective and decide accordingly who to invite to the expert interview, the recognition and choice of the experts is not arbitrary. Expert knowledge can be found not only among professionals within a given discipline, but also among other practitioners who are actively collaborating in finding transdisciplinary solutions to a given problem in a particular context. Since expert knowledge differs from other forms of knowledge, like everyday knowledge and common-sense knowledge, exploring it requires a specific methodological approach. This involves making a choice among available types of interviews and strategies for analyzing results to best support the actual goals of the research. (Meuser & Nagel 2009, 17-22.)

The appropriate approach for data collection is an open in-depth interview based on a topic guide. Open interview encourages interviewees to stretch out their own viewpoints and reflections. In-depth interview enables the researcher to explore related and contradictory themes and concepts and thus obtain subtle findings rather than only obvious ones. However, the interviewer must prepare the interview topics thoroughly and must demonstrate his own competency in the domain of expertise in order to ensure the readiness of the experts to unlock their knowledge and perspectives (Meuser & Nagel 2009, 31-32). This way the interviewer can become a conversational partner with experts. He can engage in responsive interviewing as a form of in-depth interviewing, where in addition to the main questions, probes and follow-up questions are used to extract details and explore and test ideas that emerge during interviews (Rubin 2012, xv-xvi).

In the analysis of the expert interviews, it is important to consider the organizational or institutional context that is providing guiding principles under which experts operate. Taking the context into account, in addition to a topic guide, is critical to ensure the comparability of the interviews. As a rule, the expert interviews should be recorded, but transcriptions need not to be detailed. The analysis should be focused on thematic units, i.e. passages with similar topics that can be found across interviews. Those should be mapped on the existing theoretical knowledge and categorized. The results of the research are presented as generalized findings formulated from the theoretical perspective. The process of interpretation is recursive. It requires going back to verify from the data that the generalization is done properly. (Meuser & Nagel 2009, 35-36.)

5.4.2 Expert interviews applied in this study

This section describes how expert interviews and workshops have been carried out in practice.

5.4.2.1 Data collection

The participants invited to expert interviews and workshops can be classified in the following groups:

1. Representatives of the actors from PDE
    a. Individuals

        No matter which professional role one may have, we are all acting as individuals in PDE. Part of the expert interviews had questions aimed to discover general awareness, understanding and attitudes experts may have as individuals regarding issues related to personal data. The purpose of these questions was not to obtain data from individuals as actors in PDE, but to discover biases experts may have and further understand the relevance of those biases for the subsequent data analysis. Numerous researches exist regarding those issues individuals face related to personal data. For the purpose of this thesis, rather than conducting own research, data about individuals are obtained based on literature and Internet research. Answers received for the above mentioned questions confirmed the findings form the literature.

    b. Representatives from organizations
        i. Founders of startups
        ii. Experts from established organizations such as multinational communications and technology companies, providers of digital services including big data and analytics, marketing research agencies, data brokers.

    c. Government and public sector is outside the scope of interviews

2. Experts
    a. Technical experts including IT architects and developers, data scientists and analysts
    b. Privacy and legal experts
    c. Experts in PDE

In the context of this research, the purpose of expert interviews and workshops is to help in achieving the problem-solution fit. The problem this research is addressing is defined as the misbalance of existing decentralized PDE. The proposed solution is a people centric PDE based on MyData. The goal of achieving a problem-solution fit for practical purposes is broken down to two goals:

1. Obtain evidence about the existence of certain problems in PDE and that actors care about related jobs, pains, and gains;
2. Design an improved MyData concept which provides a value proposition that addresses those jobs, pains, and gains.

Expert interviews are designed as structured, open, in-depth and responsive. The structure of the interview is detailed in Table 1. After the introduction in most of the cases, interviews took the form of workshop during which Value Network Map is utilized as a tool to capture and analyze a case of personal data flow. The case is chosen by the expert and interviewer together during the interview. The criteria for choosing the case are the following: the expert is involved in the case; the case is representative enough of the issues related to personal data in the given environment. The case study is aimed at achieving both goals of the interview: obtaining evidence about issues in PDE and improving MyData concept.

Participants:	• N.N. interviewee • P.M. interviewer		**Date**: dd.mm.yyyy **Place**: x		**Duration**: 3h
Introductory part					**Duration**: 20min
	• Explain purpose and structure of the interview, confidentiality, interviewee's rights, obtain consent for recording/documenting • Collect below information. Mandatory data is marked with *.				
	Individual interviewee: N.N.		**Company: XYZ**		
	Demographic info*	• Age, gender, education, household composition	Industry	• E.g. mobile, software, web	
	Job*	• Company, position, job description	Founded	• yyyy	
	Hobbies, preferences, lifestyle	• Work/life balance • Pace of life	About*	• Mission/vision/tagline • Web site	
	Desires, attitudes	• Goal driven vs. explorative; critical vs. credulous; curious vs. content	Product*	• Products/services description	
	Digital behavior	• What apps, what websites, why, when, how often	Customers*	• B2B, B2C	
	Personal data and privacy	• Awareness: what is it, how it is collected and used, by whom, who is benefiting, how it is affecting me? • Position regarding privacy, right to anonymity. • Issues/pain points (e.g. security, misuse, advertisements, etc.). • What values do you associate with and derive from personal data and individual privacy? As individual, as professional? • Attitude towards data ownership and control of its use. • Attitude towards data sharing: why, what, with whom.	Competitors	• Direct, substitutes	

		• If the issues are dealt with, what would be the opportunities and benefits of using personal data? For individual, business, society? • Attitude towards monetization of personal data.		
	Any other thoughts that comes to mind	•	Contacts	•
Workshop part				**Duration:** 2.5h
	Introduction of MyData concept	• Overview of challenges in existing PDE and introduction of MyData concept		Duration: 0.5h
	Case study	• Introduction of the tool to be used in case study (Value Network Map / Data Flaw Diagram) • Choose and discuss case example of personal data flow interviewee is familiar with. Interviewee or interviewer draws data flow diagram. In discussion identify particular job(s), pain points, gains, opportunities and ideas. • Re-do the case with MyData. What jobs are fulfilled, what gains achieved, what are new pain points?		Duration: 2h
Wrap-up: Summary of findings and next steps				**Duration:** 10min

Table 1: Expert interview / workshop structure

Interviews were audio recorded each time permission was obtained from the interviewee. During the case analysis, the data flow diagrams were drawn on flip charts or whiteboards. The data flow diagram was always drawn for the current state and in most of the cases for a hypothetical state with MyData. Notes about jobs, pains, gains, improvement ideas were written directly on the diagrams by both interviewer and interviewees.

Table 2 gives the overview of PDE actors and representatives involved in interviews and workshops and lists cases that were discussed. In total 7 interviews and 10 workshops have been conducted, all of them in ICT industry.

PDE Actors		Representatives	Cases	Interviews	Workshops
Organizations					
Established: 6					
	Multinational communications and technology companies, providers of digital services including big data and analytics, marketing research agencies, providers of equipment and IT services in health care	Technical experts including IT architects and developers, data scientists and analysts Privacy and legal experts	• Trageted advertizing and data agregation	1	2
			• Profiling, personalized content provisioning		1
			• Privacy compliancy case studies	2	1
			• Use of personal data in gaming industry		1
			• Data analysis service example		1
			• Personal health care data sharing	1	1
			Total:	**4**	**7**
Startups: 3					
	Mobile, web, software development	Founders	• Appointments booking and marketing platform for small businesses		1
			• Real time video editing service		1
			• Music and entertainment		1
			Total:		**3**
Academia	University of Applied Science	Lecturer, business networks	• Business networks, value co-creation	**1***	
Government	Open Knowledge Finland's MyData working group supported by Finnish Ministry of Transport and Communication	Project manager, MyData	• MyData - a Noridic Model for human-centered personal data management and processing	**2*** *informal interviews	
			Total:	**7**	**10**

Table 2: Statistics regarding conducted interviews and workshops

Table 3 and Table 4 give more detailed information about the conducted interviews and workshops respectively.

Interviews					
Date	Duration [h]	Recorded	Organization	Role of the Participant	Years of Experience in ICT Industry
15.11.2014	1,5	No	Business, small	IT consultant	20+
15.11.2014	1,5	No	Business, small	IT consultant	20+
13.2.2015	1,5	No	Academia, government	Project Manager, MyData Nordics	20+
5.3.2015	1	Yes	Business, Software and Services	Consultant, Privacy and Security	15+
6.3.2015	1	Yes	Business, Software and Services	Business Process Analyst	25+
19.3.2015	1,5	No	Academia	Lecturer, Business Networks	20+
30.4.2015	1,5	No	Academia, government	Project Manager, MyData Nordics	20+

Table 3: Information about conducted interviews

Workshops						
Date	Duration [h]	Recorded	Organization [Established/Start-up]	Number of participants	Roles of participants	Case
26.2.2015	2	Yes	Established	2	IT Enterprise Architect	Targeted Advertising and Data Aggregation
1.3.2105	3	Yes	Established	3	Data Scientists	Data Analysis service
6.3.2015	2	Yes	Established	2	Consultant, Web Analytics	Profiling, provision of personalized content
13.3.2015	1,5	Yes	Established	2	IT Enterprise Architect, Web Analytics	Cross channel targeted advertising
18.3.2015	3	Yes	Established	2	IT Consultant	Personal health care data sharing
22.3.2015	2	Yes	Established	2	Consultant, Privacy and Security	Consumer complaint process and government authority requests
11.4.2015	4	Yes	Established	2	Gaming expert	Use of personal data in gaming
27.4.2015	3	No	Start-up since 2013	2	Founder	Use of personal data in real time video editing service
8.5.2015	3	No	Start-up since 2011	2	Founder and CEO	Use of personal data in marketing platform for small businesses
2.6.2015	3	No	Start-up since 2013	2	Founder	Use of personal data in music sharing service

Table 4 Information about conducted workshops

5.4.2.2 Data analysis

The process of data analysis and concept iteration is depicted in Figure 24. The process started with documenting the information from the conducted interviews and workshops and continued with data analysis. The findings and insights from the data analysis were used for updating customer profiles and value propositions. MyData service concept was then updated with upgraded use cases based on new solutions and ideas. Previous assumptions were updated based on new findings, and future workshops planned to address the remaining assumptions for targeted customer segments. The literature was reviewed continuously throughout the whole process.

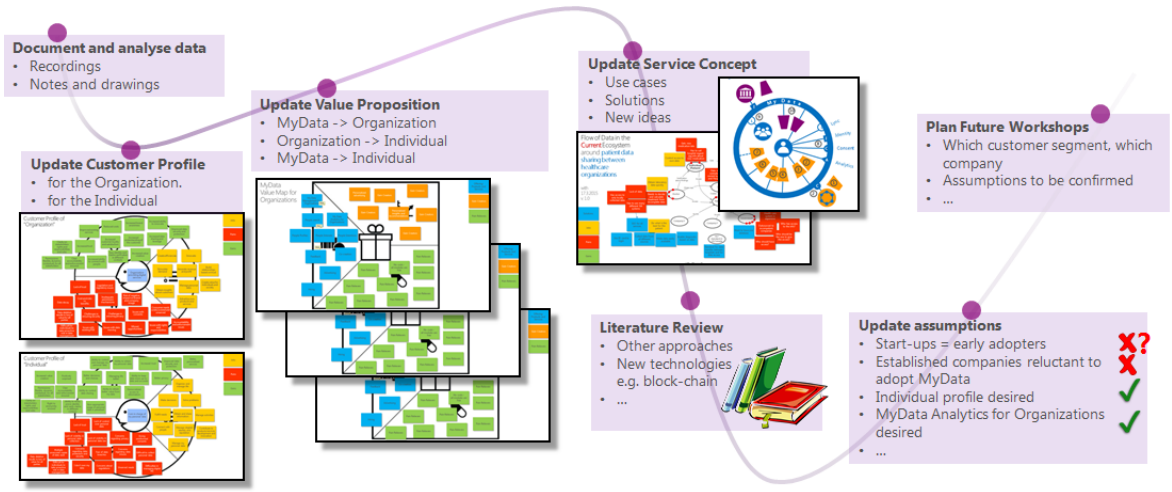

Figure 24: Data analysis and concept iteration process

5.4.2.2.1 Summaries and memos of audio recorded interviews

After the interviews, the diagrams were re-drawn in electronic form using MS PowerPoint, and the key findings were summarized. A detailed transcription of the recorded interviews was not considered necessary for the analysis. The summary made after the interviews based on written notes and was updated after listening to the recorded material. If the interview was not recorded, a memo was written immediately after the interview. These memos included more extensive notes regarding the discussions and some quotes that were representative of the key points made by interviewee. The researcher's own thoughts were noted separately during this process.

5.4.2.2.2 Coding

Different concepts and themes were used to help organizing and analyzing the data. Concepts refer to typical statements describing individual pains, gains and jobs. For example, concepts related to pains can be phrased as 'difficult to present', 'difficult to read', 'lack of data', 'concern regarding data misuse' etc. Themes are clustered concepts. The following words can help to identify themes: 'because', 'as a result', 'due to', 'therefore', 'as a consequence of'. For example, 'lack of trust' is the result of 'misunderstanding' and 'lack of transparency', but

also results of ‘misbehavior’ and ‘lack of security’. We can therefore conclude that the ‘lack of trust’ could be a theme.

The process of creating codes started as a hybrid process, using both pre-set and open codes. Selective coding took place later, when the codes were refined into more detailed coding and understanding. Glaser (1978, 56) describes “open coding” as follows: “The goal of the analyst is to generate an emergent set of categories and their properties which fit, work and are relevant for integrating into a theory”. On the other hand, as Glaser explains, “selective coding” serves to delimit analysis work by focusing it within the context developed in open coding.

The initial or pre-set codes were derived from prior knowledge and internet research. These were initially assigned as pains, gains and jobs to three customer profiles: Individual, Organization and Government. The data collection and coding started with pre-set codes which helped to define the research questions and planning, conducting and adjusting the direction of the research. In the initial codes, the distinction between concepts and themes were not present. During the process of data collection and analysis, many new codes emerged in forms of concepts, and also themes as groups of concepts became apparent. During some workshops, it was possible to draw how different concepts, e.g. pains, were connected in cause-and-effect relationships. See the example of “Flow of Data in the Current Ecosystem around Consumer Complaint Process and Government Authority Requests” in Figure 25. This helped in identifying the themes and enabled better understanding of their content and connections.

As in the given example, the emerging concepts resulting from open coding (Glaser, 1978) were written on data flow diagrams drawn on paper or whiteboard together during the workshops. After the workshops, selective coding was carried out by refining concepts to fit the data from the recorded discussions and the results were recorded in the form of PowerPoint slides.

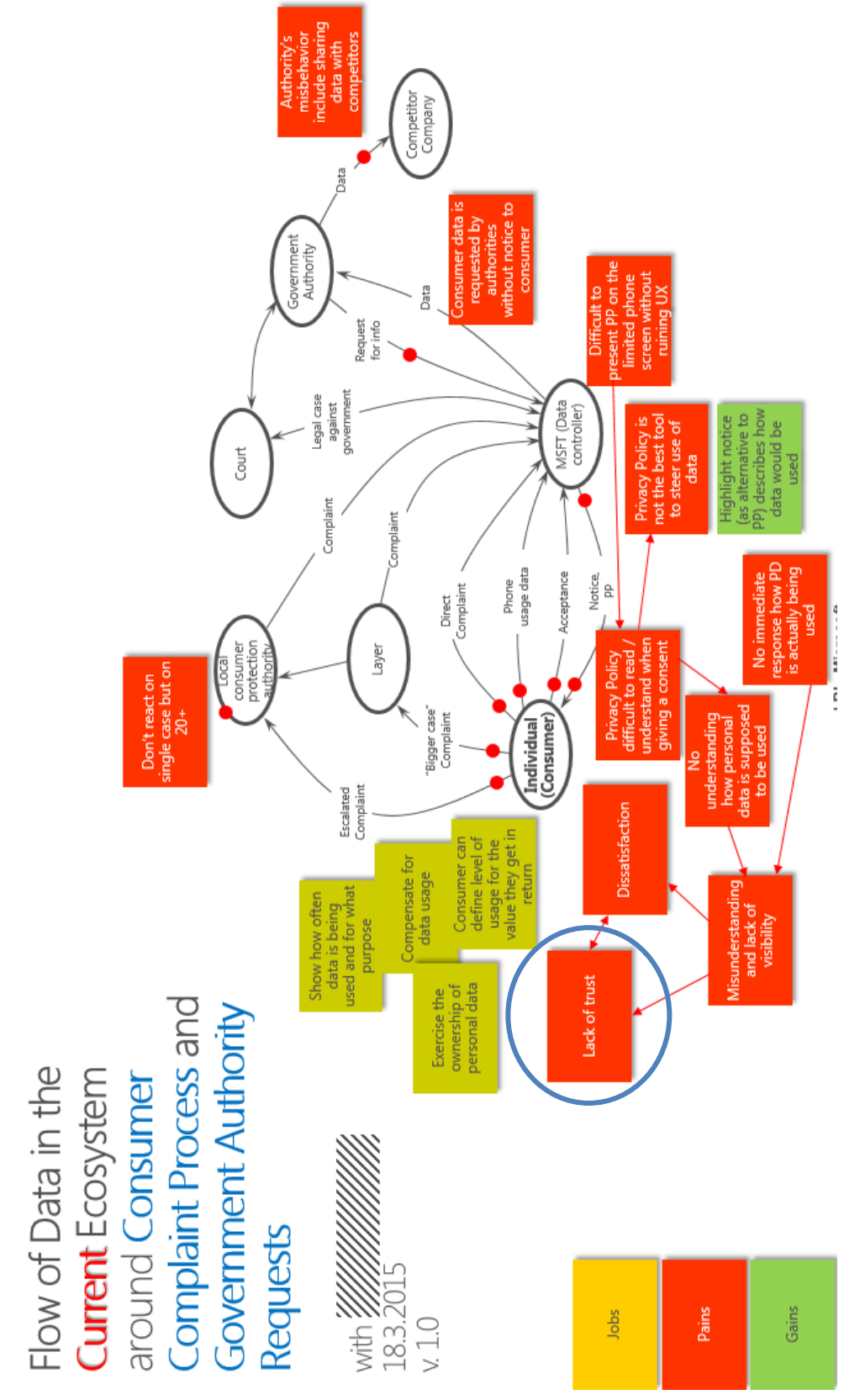

Figure 25: Example of data flow diagram

5.4.2.2.3 Update of MyData value proposition and concept

As described in Figure 24, as the result of the data analysis additional jobs, pains, and gains were discovered. These were used to update customer profiles of individuals and organizations and value propositions from MyData towards organizations and individuals and from organizations to individuals. Updated customer profiles and value propositions, together with new ideas collected during the workshops plus additional literature research, were the inputs used in creating the subsequent version of the concept. Throughout this process, the list of assumptions has been maintained. Existing assumptions were confirmed or contradicted, and new ones added to the list. All these outcomes together were used in planning the subsequent workshops. Decisions were made about what customer segment to focus on, what organization to choose and what assumptions to address. Examples of customer profiles and value maps are given in Appendix 1, while examples of data flow diagrams in MyData based PDE are given in Appendix 2.

Following this cycle, every interview and workshop has effectively resulted in additional iteration towards a problem-solution fit. Achieving a problem-solution fit is the prerequisite for balancing co-created value with competing rights and risks for all the actors in a balanced PDE.

6 Findings and results, final concept

This chapter describes the findings and results and proposes a concept of MyData. This is based on the empirical and literature research explained in earlier chapters.

6.1 Findings

As mentioned in the introduction, the transition towards the utilization of MyData has been of special concern since the very beginning of this research. It influenced the early choice of organizations for the research. The initial assumption was that start-ups should be attracted first to use MyData as they would benefit the most of MyData service. MyData would enable them to provide innovative personalized services in short improvement cycles, thus become more competitive faster. That would ignite competition and encourage rapid adoption of MyData.

Contrary to the initial assumption, start-ups showed much less interest in MyData. There were only a few first adopters among the start-ups, and their number may not be big enough to quickly reach a tipping point of MyData adoption. This can be attributed to the immaturity of start-ups in understanding challenges and potential of personal data in comparison to established organization. Those start-ups whose business is directly built around the utilization of personal data were the exceptions interested in MyData. Established organizations appeared much more probable to take the role of first adopters than originally thought. Consequently, established organizations and start-ups should be approached differently about the adoption of MyData. Clearly, more focus needs to be given to established organization. The approach needs to be tailored include pilot projects. The process of adoption of MyData is beyond the scope of this study.

Establishing trust was confirmed as a key challenge. Trust is a more critical topic for start-ups, and it has been repeatedly surfacing in interviews/workshops. The discussion on trust shaped the major conclusion of the thesis. Trust is not absolute, but we can design for trust, and be much more trustworthy in implementing MyData than other alternatives. This has strengthened the conviction that MyData approach could work.

The study of the existing alternative approaches at a conceptual level suggests that they appear inferior to MyData in balancing co-created value with competing rights and risks for all the actors.

6.1.1 Key insights from start-ups

The main insights from start-ups are the following:

- Lack of trust towards third parties
- Strong sense of data ownership
- Immaturity in dealing with personal data, understanding its challenges and potential
- Traditional, less sophisticated practices used in targeting customers
- Sharp differences exist between start-ups (early adopters vs laggards), thus requiring different approaches in MyData adoption
- Design for trust is a differentiator between services

The interviewed start-ups were typically reluctant to open and reveal their business in sufficient level of details even though the purpose of the interviews/workshops and confidentiality aspects were thoroughly covered at the beginning. Therefore, some adjustments in the interview/workshop approach were made to obtain and strengthen the trust. It was important to make clear that this research had no business objective, but it was an attempt to co-create something together at a conceptual level. Also presenting MyData in a simplified form in familiar terms, for example "MyData is a 'platform' for handling personal data", helped them imagine how they could benefit.

Most of the start-ups interviewed had a strong feeling of ownership of their data and a strong belief that they must keep the data for themselves. They considered their data as "a blood of the business", as start-up #2 stated. They acknowledged that other businesses, using their portal service, had a right to change the data, but they were still the ones who owned it. They also claimed they owned individual customer data. Consequently, they did not trust any external party to hold the data. Start-up #2 stated that they "would never accept data to be collected elsewhere".

Start-ups were less aware of problems around personal data. Therefore, they were not able to grasp the full value and potential of MyData. They considered some elements of the solution, like profile and analytics, desirable. Labelling MyData as a "philosophy" or an "academic solution" that does not exist, they pointed out that they needed something concrete for utilizing personal data and they need it now. Therefore, it was challenging to engage them in the discussion on MyData solution at a conceptual level. They were occupied with details of technical implementation. They would rather go for existing solutions to obtain access to people's profiles like Facebook, Google, etc. This is because they exist and they are good enough for the purpose, although their deficiencies seem recognized. Problems in PDE were simply not problems for most start-ups and therefore, they concluded, MyData solution would not help them.

Start-ups also recognized the challenge of having too much data, only a smaller part of which they consider interesting. They believe that having good analytics is the way to extract and utilize relevant data. However, they realize that customers' interests are not uncovered reliably based only on site browsing behavior, but they consider it acceptable to push wrong advertising to 30% of customers. As the founder of one of the start-ups explained during the workshop "If people don't like it they should ignore it", adding that "anyway observing this percentage is good learning for the company." These traditional practices that treat customers improperly are cheap to implement and may appear acceptable in the absence of stronger competition.

Some believe it is not possible to achieve and sustain trust. They agree trust is an issue, but they don't believe there is a solution for it. "Nobody can guarantee anything, and you have to live with it" was the conclusion from one of the founders. However, they did agree that designing for trust makes it possible to make one service more trustworthy than the other.

Not all start-ups were skeptical of MyData. One of them clearly realized the value of MyData for their business and stated that they "would use MyData immediately". During the workshop we went further and for most of the time focused on identifying and exploring opportunities MyData could bring to their business.

The sharp differences between start-ups regarding MyData can be attributed to the small sample of start-ups. To get better insights and draw stronger conclusions, research needs to be widened. Even this small sample revealed some characteristics of this customer segment. Start-ups are rather immature regarding understanding issues and the potential of personal data, as they have not experience it yet, they have not anticipated it, and the competition is weak in the given market. To attract them to become MyData users, more awareness is needed.

However, there are also early adopters among start-ups, but in their adoption of MyData, they must be approached differently than established companies. Here focus should be on harnessing the potential of MyData related to their own innovations and take current business forward with concrete solutions, rather than addressing some non-existing issues like legacy data issues that are worrisome for established companies.

6.1.2 Key insights from established companies

The main insights from established companies are the following:

- Maturity in understanding personal data, its challenges and potential

- With MyData, competitive advantage shifts towards the ability to innovate and build and maintain lasting relationships with customers and society
- Concerns about MyData as “single point of failure” and data misuse
- Focus on opportunities and innovations with MyData
- Established companies are likely first adopters

Established companies are much more mature in understanding ownership of data and related issues. They clearly stated that technical implementation and utilization of MyData is not a problem, as the needed technology already exists. All their focus was on understanding the concept of MyData and how it deals with existing problems and opens new opportunities.

In the interviews, the point was made that personal data used to be a competitive advantage for the companies. With MyData service such competitive advantage would disappear, as the same data would be potentially available for all. Thus, the discussion was focused on how companies could then differentiate. The answers were found along the lines that companies can differentiate through innovations that are competing in bringing more value to individuals and society and the relationship they develop between them. Innovations could be enabled with proper understanding of individuals and their needs, since MyData could enable dialog between organizations and individuals. Many issues related to personal data collecting, maintaining, storing, controlling, owning, etc. could be removed from the organizations, releasing their resources to focus on innovations and improving relationships. They could all start from the same trusted baseline and compete based on their abilities to understand, innovate, engage, and co-create what really matters to people and society.

Another topic of concern was that companies could try to misuse the data once they got them. Clearly there would always be such cases. In response, individuals should have the possibility to deny these companies the access to service usage data and their profiles. That could possibly mean ending the usage of the service. Personal data are constantly changing as people and circumstances in their lives are changing. Therefore, once obtained information expires at some point. If the company is blocked by individuals, it cannot sell or advertise to them. This right to stop using the service at any time is the key control factor of future (digital) markets.

The general findings based on the literature were that established companies were reluctant to share or enable the flow of personal data, as personal data was considered company asset. Somewhat contrary to this, representatives from big companies that participated in the interviews and workshops were not uncomfortable with personal data stored elsewhere. Although, it is fair to say, they were not high-level decision makers in their companies. Widespread use

of cloud services in established companies has possibly also contributed to accepting MyData concept.

It was pointed out that, as MyData is becoming “single point of failure”, it is critical to ensure security, prevent misuse and intentional entry of incorrect data, support growth and maintain the data, while having the service available 24/7. MyData must excel in those key elements associated with trust like security, availability and reliability. If MyData succeeds in ensuring trust, increase in trust is felt by all actors in the ecosystem.

In virtually every workshop we ended up identifying more needs that could be fulfilled with MyData centric solutions in comparison to existing solutions. Utilizing MyData also triggered some innovative thinking or made some new approaches/solutions easier to implement. Participants were united in recognizing that MyData could enable myriad of innovations.

Due to their maturity in dealing with personal data and their ability to grasp the potential of personal data, established companies are more likely first adopters of MyData than start-ups.

6.2 MyData Concept Final

6.2.1 Building Blocks

The building blocks of MyData Service Concept are presented in Figure 26. These elements were motivated by literature research, as discussed in the Chapter 4, Modified Preliminary Concept, and further explored in the concept creation phase.

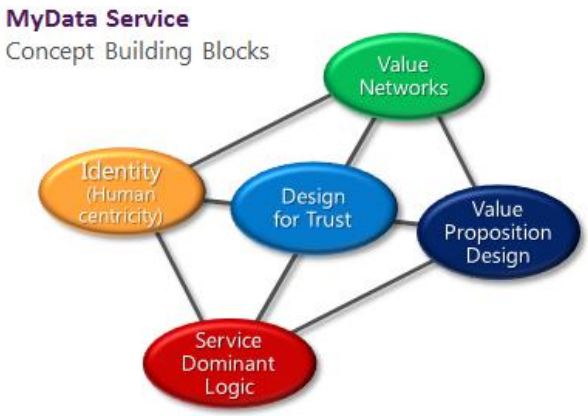

Figure 26: Building blocks of the concept of MyData service

6.2.1.1 Identity and Human Centricity

Personal data is part of personal identity (physical, physiological, mental, economic, cultural, social), and as such under protection of fundamental human rights. In the merging physical

and digital world, identity is also merging into one identity. MyData is a digital embodiment of an individual's identity. It consolidates scattered identity data into one logical place, changing current organization-centric PDE to human-centric PDE. As we will see later in the detailed concept description, MyData maintains identity of not only individuals, but all the actors in PDE, including organizations and governments.

It is important to stress again that people are the ones who form and operate organizations and governments. Therefore, all the products and services are made by people, with people, and for people.

6.2.1.2 Service Dominant Logic and Value Networks

PDE is studied in the context of value networks with applied SD logic focusing on relationships between actors, their interactions and collaboration for value co-creation. In that context, MyData appears as a major hub in the personal data value network enabling value exploration from personal data asset.

6.2.1.3 Value Proposition Design

We assume that PDE is balanced when co-created created value is balanced with competing rights and risks for all the actors. Research has demonstrated that in this context, the Value Proposition Design approach can be applied through minimizing pains, maximizing gains, and satisfying more needs for all key actors at the same time, ultimately leading to more balanced PDE. MyData is not a fixed concept, but an evolving one with an inherent mechanism for self-improvement.

6.2.1.4 Trust

MyData is designed, implemented, and operated for trust. This is the fundamental principle without which MyData would be unsustainable. MyData must be trustworthy at all times, demonstrating its competence and commitment to do what it is trusted to do.

6.2.2 MyData Concept

MyData Concept (Figure 27) describes the service that realizes ownership of personal data by the individual the data is about. It enables human centricity in PDE. Other key actors are organizations and governments including the public sector.

All personal data (volunteered, observed, and derived) are stored in MyData. MyData is logically centralized, like a layer in existing Internet. Physically, it would be geographically spread and compliant to applicable national and international laws.

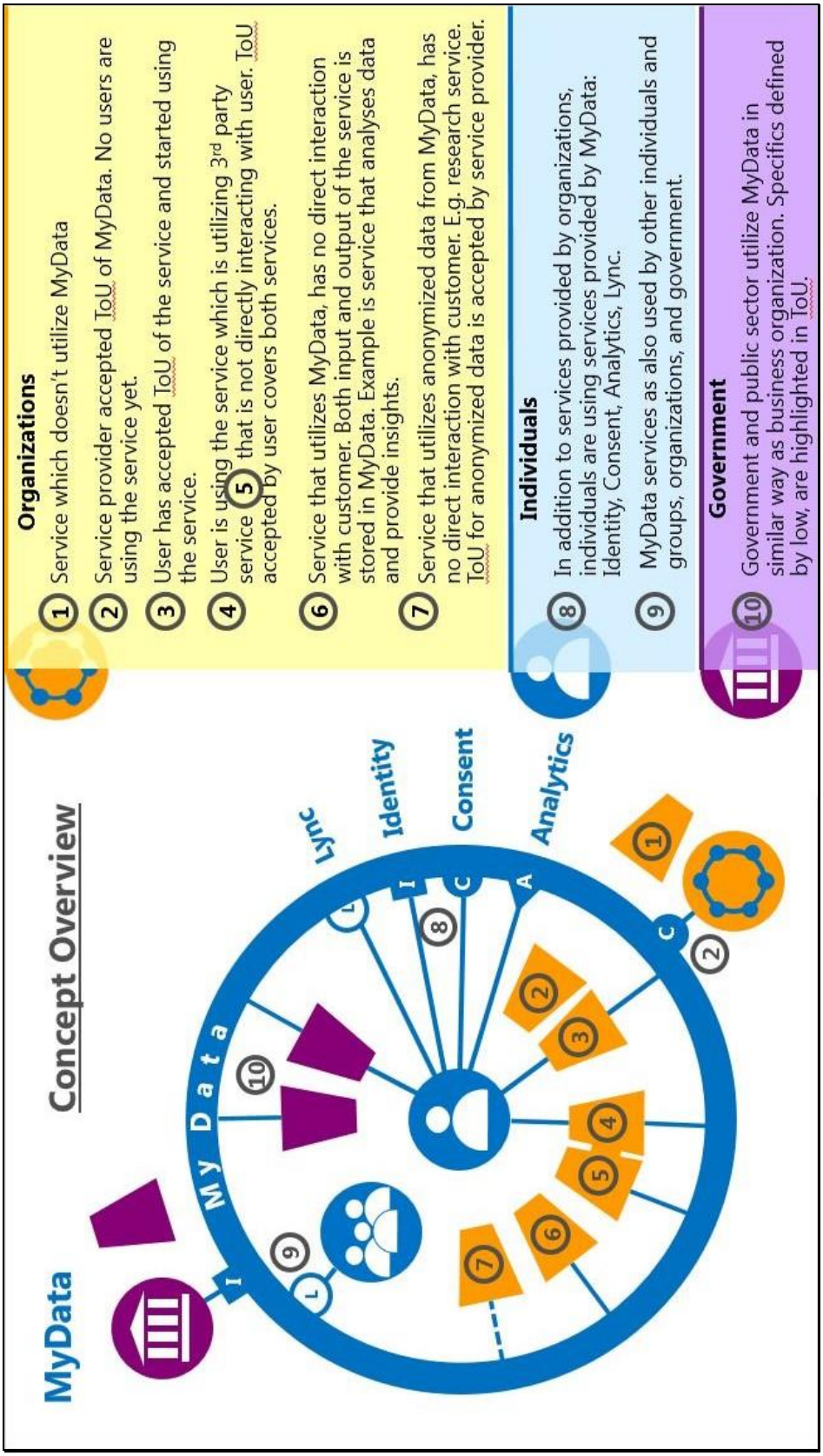

Figure 27: MyData service concept overview

The orange shapes depict organizations and their journey in becoming MyData organizations, i.e. organizations that are utilizing MyData in delivering their services. In this context, the numbers indicate different services depending on how they are used and connected to MyData. Governments and the public sector utilize MyData in similar manner as organizations. Being out of the scope of this thesis, specifics of this utilization are not considered. Individuals and groups are using services provided by organizations, governments and the public sector, and MyData.

MyData exposes the following services for use by all three actors: Identity, Consent, Analytics and Lync. Their concept is the result of a 3-way problem-solution fit advanced throughout this research to balance co-created value, rights and risks for all the actors. Functionality richness, high quality and user experience of these services are critical for adoption of MyData. Third party developers would be invited to utilize open APIs and innovate in enhancing those services.

6.2.2.1 Identity

Identity service enables actors to learn about, define and maintain their identity. Part of the identity service is the profile. It contains various sections. Each section can be tagged for use for different purposes, and control is enabled to allow or deny its use. Sections differ for different actors, but all the actors need to identify themselves providing some mandatory information when registering in MyData.

Individuals have sections classified as private and as professional. Private sections of the profile can include preferences, hobbies, wishes, dreams. Professional sections can include professional competences, experience, achievements, references, etc. When applying for the job, applicants can consider suggested sections and give consent to possible future employers to access the required sections. Information in some sections, e.g. preferences and hobbies, is provided by individual. Others, e.g. information about education, credit history, committed crime, are provided by a third party and cannot be changed by individuals. Additionally, Identities contain many verified attributes like biometric (voice, retinal, photo, fingerprint) or for example trusted devices (including mobile and IoT devices) associated with the individual. As people would be continuously online with many things capturing their data, MyData must ensure continuous identification.

The identity service demonstrates how some latest concepts are supported by MyData, for example principles of self-sovereign identity (Allen 2016). Satisfying these principles, users of MyData have independent, unique existence; have persistent, i.e. forever living, identity; have control over their identity, supported by continuous validation of identity and its claims; can choose publicity or privacy; have access to own data. Systems and algorithms operating identity are transparent, portability and interoperability is embedded in MyData, as well as

consent handling for data sharing, minimization, and protection of user rights through identity authentication.

The identity service for organizations provides a company profile which includes the company's purpose, vision, mission, strategy, values, etc. There are also verified attributes for companies, e.g. those related to assets, shares, revenue, and profit, but also disputes, lawsuits, etc. In addition to own identity, companies maintain the identity of their services utilizing MyData. Each service that is built to use MyData needs to be registered via the Identity service. There is also a section for marketing such products and services.

6.2.2.2 Consent

The consent service enables PDE actors to maintain their own consents and Terms of Use (ToU) of their services and their data. MyData has its own ToU, and when it changes, all actors are prompted to accept new version.

When registering a service, the company needs to provide its ToU. Companies can change ToU of service in which case all users are prompted to accept new version. Actors can engage in discussion at any point that can in this case result in clarifications and improvements of ToU. History of changes in ToU and consents is recorded and available.

There is a separate section dedicated to references to applicable laws, which can be used as an aid for constructing and understanding ToUs.

It is important to highlight that when accepting the ToU of MyData, the company agrees to store all personal data including volunteered, observed and derived, in MyData. Observed and derived data can be shared with other parties (other companies, researchers, government) in which case both individual users and organization service providers need to give their consent. Data can be anonymized from the perspective of all actors. For example, a company can give consent for utilizing non-anonymized data of the usage of their service for research purpose. By accepting ToU of MyData all actors agree on default consent for use of anonymized data. In regulated circumstances actors can revoke their consent for the general use of particular type of anonymized data or for the specific use of the particular type of anonymized data.

6.2.2.3 Analytics

All activities by all actors that involve use of personal data are logged in MyData. Analytics service provides insight to individuals about the usage of their data. This includes information about what data was used, when it was used, by whom, for what purpose, under which con-

sent and which ToU. The literature points the need for “meaningful transparency” and the danger of too much transparency and transparency without control (WEF 2014, 7). MyData eliminates those issues by providing full control over personal data and utilizing the latest advances in data visualization present information at any level of abstraction or detail in the relevant context.

Individuals can review a wide offering of personal analytics, use readily available analytic tools themselves, and request provision of additional insights. They can also review relevant (anonymized) analytics from other individuals, and set alerts related to the use of their own data.

Profiling is a third-party service offered to MyData organizations. Selling it to organizations outside of MyData would be in breach of MyData ToU. Users can see how they are profiled, what are the attributes used in profiling, who is using the profile and for what purpose, and give their consent. Profiles cannot be used without the consent of those who are subject of profiling. Executed in the context of MyData, profiling service addresses the problems described in detail in section 3.6.1
Profiling.

Companies can use Analytics to find out who their current and potential customers are. Here they can find or order customer profiling, market studies, and other types of analysis, which can help them with segmentation, targeting, finding early adopters, learning about competition etc. Companies can further use Analytics to obtain information about the usage of their services. Workshops of the current empirical research confirmed the importance of Analytics service for startups because they do not have such capabilities developed. Different data sets, like service usage and customer data, can be combined and new insights provided. Analytics also helps to understand and present customer feedback, which can be collected in various forms through Lync service (e.g. in a form of Net Promoter Score). This can support and speed up learning, continuous improvement and innovations. Numerous other company functions can be supported by Analytics service, like Call Centers or Help Desks where the accurate information about individual user, the status of the use of the service in question, issues and suggestions for resolution would be readily available.

Companies can build their own analytic capabilities or utilize those from companies specialized in analytics. In either case, observed and derived data is stored in MyData, which makes it available for individuals the data is about to exercise their control.

6.2.2.4 Lync

Lync service connects the actors of MyData. There are common functionalities available for communication like chat and video calls. Others are actor specific. For example, individuals can connect with other people, find likeminded people, engage around hobbies, interests, clubs, friends, etc. MyData fully supports people's right to present themselves to others anyway they wish, like they do it on Facebook, but MyData ensures that the there is a true identity behind these presentations.

6.2.2.5 Use Cases and Service Blueprint

Selected MyData use cases for organizations and individuals are presented in Figure 28 and Figure 29, respectively.

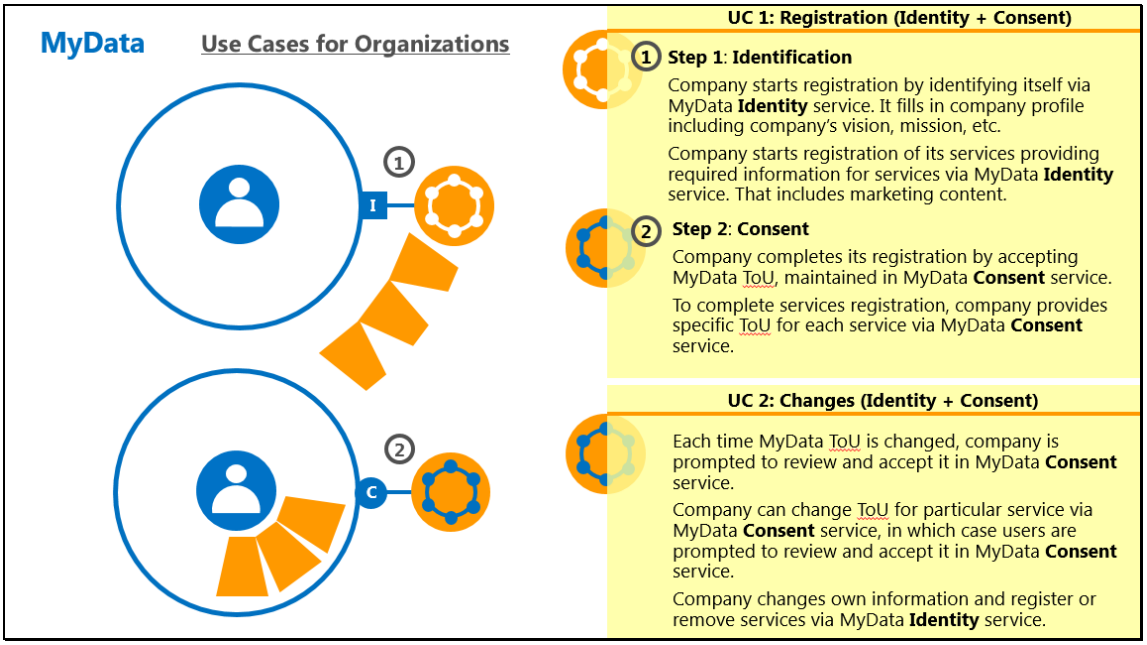

Figure 28: MyData Concept – Use Cases for Organizations

All actors need to register themselves and accept MyData ToU before they are able to start using MyData. For example, as described in Figure 28, during registration organizations fill in a company profile utilizing Identity service and agree on MyData ToU provided by Consent service. After registering itself, the company can proceed with the registration of their services. For each service, the company needs to provide a specific ToU. There would be special utility available to help in ToU creation. As a result, ToU is presented to customers in a readable and understandable form and language. Additionally, MyData would be able to present ToU in personalized ways, having sections containing information related to individual's sensitive topics or concerns highlighted.

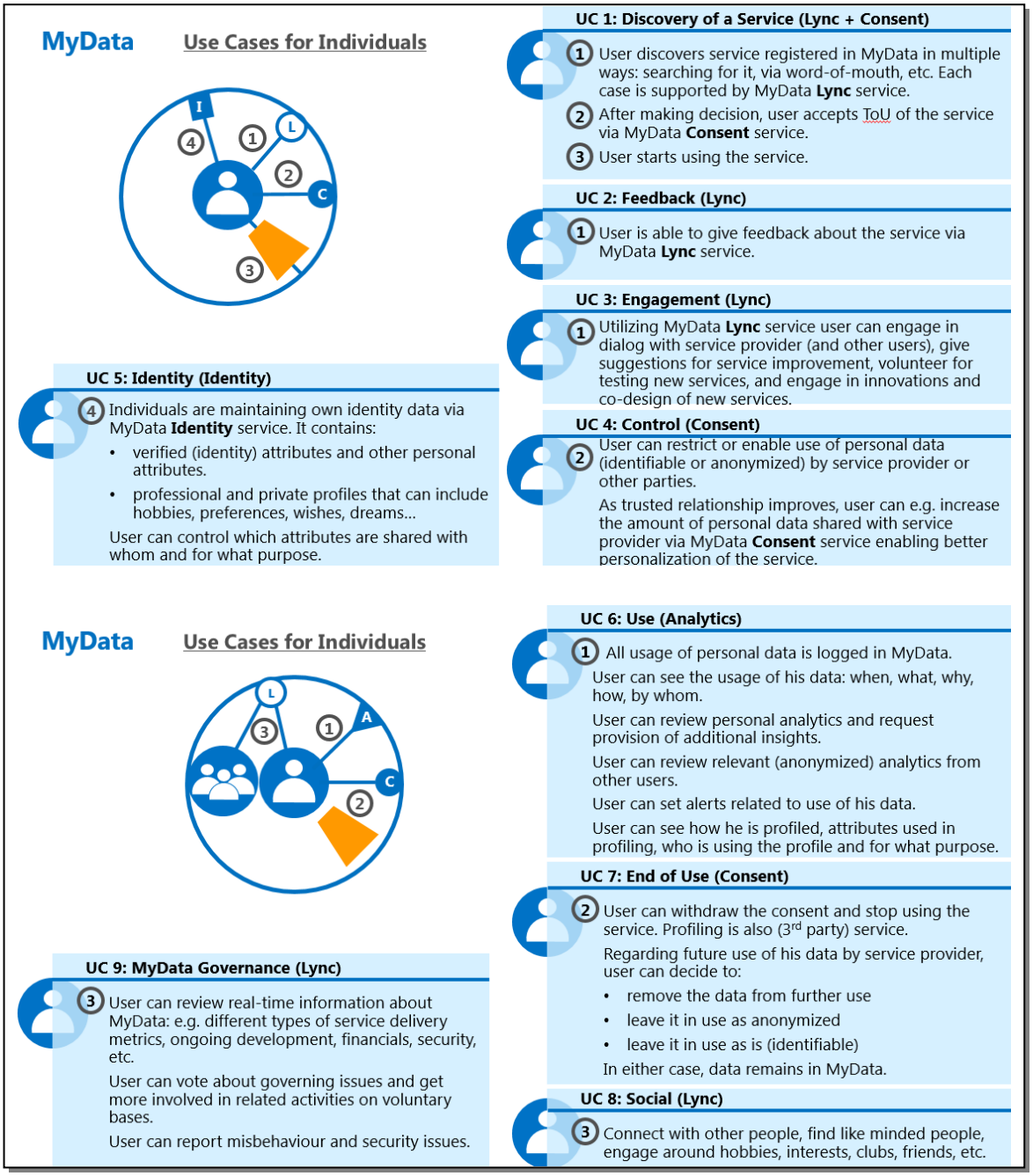

Figure 29: MyData Concept – Use Cases for Individuals

Enabled by MyData, all the services (including MyData services) are expected to improve fast and change frequently, e.g. due to increasing personalization. That would require continuous renewal of consents for evolving ToU. Therefore, ToU needs to have changes between versions presented in understandable form. No matter how well ToU is presented, there will always be need for clarifications. This is only one among the many reasons why enabling dialog between actors becomes very important. This is done via MyData Lync service.

MyData service blueprint (Figure 30) covers use cases related customer journey in usage of the service from the service discovery, through its use, till the end of use. Discovery is sup-

ported by Lync such services as search and social media. Use is supported by Lync feedback and chat services, Analytics and Consent services.

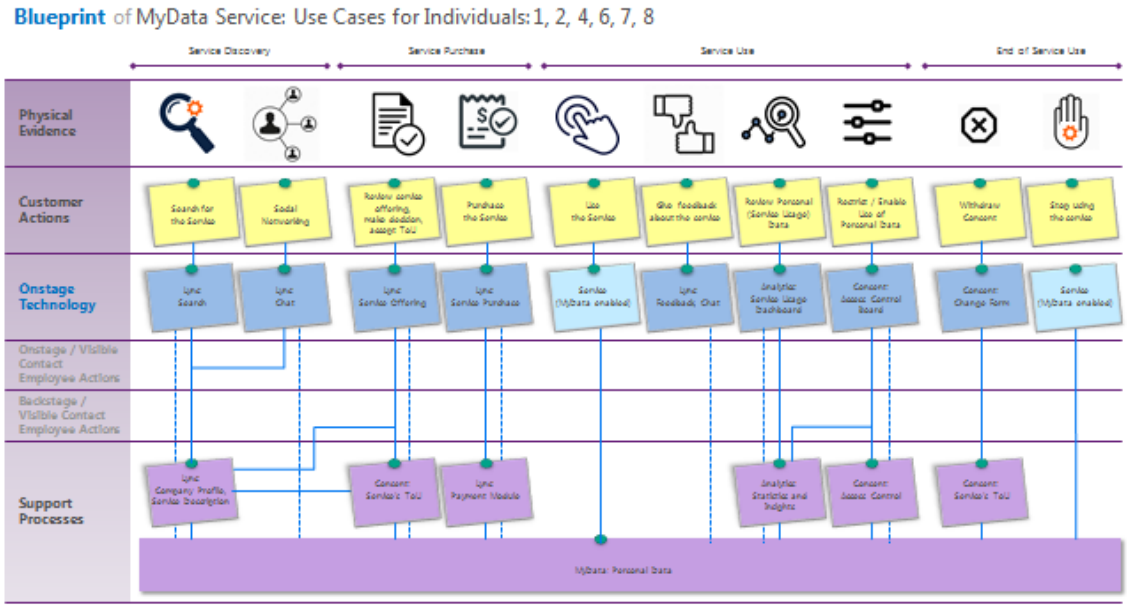

Figure 30 MyData Service Blueprint for selected use cases for individuals

Other important use cases for individuals are related to maintaining their identity (Figure 29). Individuals can review and update editable sections and review those containing verified attributes. Control can be exercised on each section according to applicable lows.

6.2.2.6 Business Model and Governance

MyData would be a non-profit organization. As such, it would direct its surplus revenue toward further achieving its purpose. Building a business model is out of scope of the thesis, but in principle, organizations could be charged for using MyData services. That income would be returned through evolving services that are bringing benefits for all. For example, from organizations specialized in big data analytics, various services would be ordered, and outcomes (e.g. studies) would be made widely available.

Large group of use cases covering governance of MyData would be developed once the governance model is designed. Those would cover real time information sharing regarding MyData use, development, financials, security, etc. Other use cases include voting about governing issues and involvement in related activities on a voluntary basis. Users can further report misbehaviour and security issues.

6.2.3 Benefits from MyData

MyData is providing significant benefits for all the actors in PDE. These are related not only to removal of pains present in current unbalanced PDE, but to various interconnected gains for all actors in balanced PDE.

MyData enables individuals to understand and manage their personal identity. Personal identity is an evolving concept we develop about ourselves throughout our lives. It contains elements that cannot be changed, like date of birth or race, but also those that are the results of choices we make during the course of our lives, like who we interact with, how we spend our time, what we believe in. By organizing personal (identity) data in sections, MyData helps us understand how we appear to others and also enables us to keep some elements of our identity for ourselves and reveal it only in trusted relationships. Everything we do is recorded in MyData, but we decide who should have access to that information. For example, browsing of websites would always be linked to our identity, but we can decide whether anonymized browsing history would be available to the site provider, or having this set as default.

MyData effectively adds an identity layer to Internet. All the actors (individuals, organizations, and governments) are enabled to maintain their identity and they are all continuously individually identified throughout their existence in the merged physical and digital world. Also, all the services are identified by being linked to identities of their providers/owners. Consequently, this could remove concerns about authenticity of a web site when it is registered as a MyData service. Having all actors and services continuously identified significantly contributes to strengthening trust among them.

Ownership of personal data comes from the ownership of own identity, it is in the hands of individuals the data is about. This ownership involves rights, such as the right to exercise control over personal data, but also duties towards other data owners, acting in compliance to MyData ToU, leaving anonymized data available for research and use for wider benefits, etc. Control of personal data assumes:

- Visibility into the content of personal data (all personal data are collected in MyData)
- Visibility into the use of personal data (what, who, when, how, why – under which consent/ToU)
- Ability to control the use of personal data by regulating availability of certain data for certain purposes by certain actors.

Organizations and governments share the ownership of observed and derived data with individuals. When the ownership is shared over the data, consensus is required when the data is shared with a third party. This is often the case when organizations invite other organizations to improve existing services or innovate.

All the actors benefit from connecting to each other: individuals to get their voices heard regarding commercial and government services, to find and engage with likeminded people, to organize around initiatives, etc. MyData helps organizations to know their customers, discover their unsatisfied needs, and engage them in improvements, innovations and co-design of new services. Accurate information individuals reveal about themselves helps organizations to develop truly personalized services. For example, changing the consent i.e. what personal data is shared could affect functioning of personalized service in real time.

Examples of other benefits of MyData include the following:

- Thorough and fast alignment with changing regulations. All the actors are informed about regulatory changes, changes in MyData to comply, and prompted to accept new version of MyData ToU.
- Various types of academic and commercial research, from psychological and social to medical and industrial.
- Results of psychological tests are included in people's profiles and used for better understanding of their abilities (e.g. intelligence), interests and personality. Individuals can use them for personal development. Classified as sensitive information, some of them with expiration date; it requires careful and informed use.
- Myriad of problems and solutions (attempting to solve problems in PDE like interoperability, etc.) would be non-existent
- Call for bringing MyData services to the next level, to innovate in user experience and graphical representation of complicated personal analytics, consents and ToU, etc. offers the challenge to creativity and invites startups to engage.

6.2.4. Challenges of MyData

Although MyData is concepted for trust, the biggest challenge remains how to build and operate MyData to gain and sustain trust. Failure to ensure trust would undermine the raison d'être of MyData.

One concern raised in workshops was that MyData would be a "single point of failure" as it was concepted as virtually centralized. In the worst case, unavailability of MyData would make all the services using MyData unavailable.

Data security is another major point of concern. Data security refers to the confidentiality, availability, and integrity of data. When data security is in place, the data is accurate and reliable and can be used only by authorized individuals or parties.

Another big challenge is the implementation of ownership and governance of MyData, both for trust. Possessing intimate knowledge about people, businesses, and to some extent governances, makes it possible for MyData to become an ultimate “Big Brother” with immense power to influence and steer people’s lives.

The implementation of MyData would require long time, enormous resources and numerous innovations. However, technologies are already available. The most promising is blockchain technology, described earlier in section 4.2.1, because it addresses all the above-mentioned challenges. Enabling distributed and decentralized cooperation, blockchain is considered the foundation for establishing trust and decentralized global governance.

Technology alone would not be enough to ensure the success of MyData. All the actors, i.e. the users of MyData should be motivated, incentivized and enabled to monitor and report inappropriate use of data and take part in MyData development, operation, and governance.

7 Discussion

In this chapter, the proposed MyData concept is discussed by comparing it with an existing similar concept, the MyData Nordic Model. First, the nature of MyData Nordic Model is discussed and then it is compared with the proposed MyData concept.

7.1 MyData Nordic Model

The MyData Nordic Model approaches reform of PDE from the infrastructure level in order to enable individuals to control their personal data. Central to this approach is the MyData Account service (Figure 31), which is used for consent management. Based on given consents, data flow is enabled between sources and users. MyData compliant APIs are used to implement data and consent flows. MyData Account service is provided by operators. Individuals use a centralized dashboard in MyData Account to exercise control over their personal data. There they can grant access and control permissions for multiple data sources and data using services. Personal data is normally not stored with nor transferred through MyData account. The primary function of MyData is not to provide personal data storage (PDS) solutions but to enable consent management and data flow directly between the source and the user. Standardized architecture enables interoperability between accounts and allows individuals to switch between MyData service operators. (Poikola 2014.)

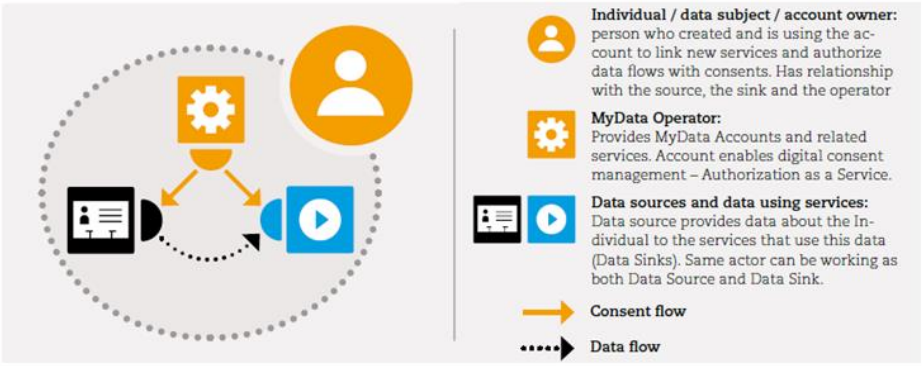

Figure 31 MyData Nordic model, source: (Poikola 2014)

The interpretation of MyData Nordic model is given in Figure 32 in the form suitable for comparison with MyData model. Clearly, personal data is not centralized. It remains with sources and users, thus scattered across services. Data flow is enabled, yet data flow paths can be lengthy and complicated. To obtain the data needed, the data using service needs to connect to multiple sources. On the other hand, sources would be connected to multiple users, with major ones connected to millions of users. With MyData Nordic, organizations would use the opportunity to obtain different types of personal data increasing the number of connections. As the number of services continues to grow, the number of connections with MyData Nordic

will grow even more then without it. Security risk associated with data transfer would increase with the rapidly increasing number of data flows. PDE is likely to get more complicated than it is now.

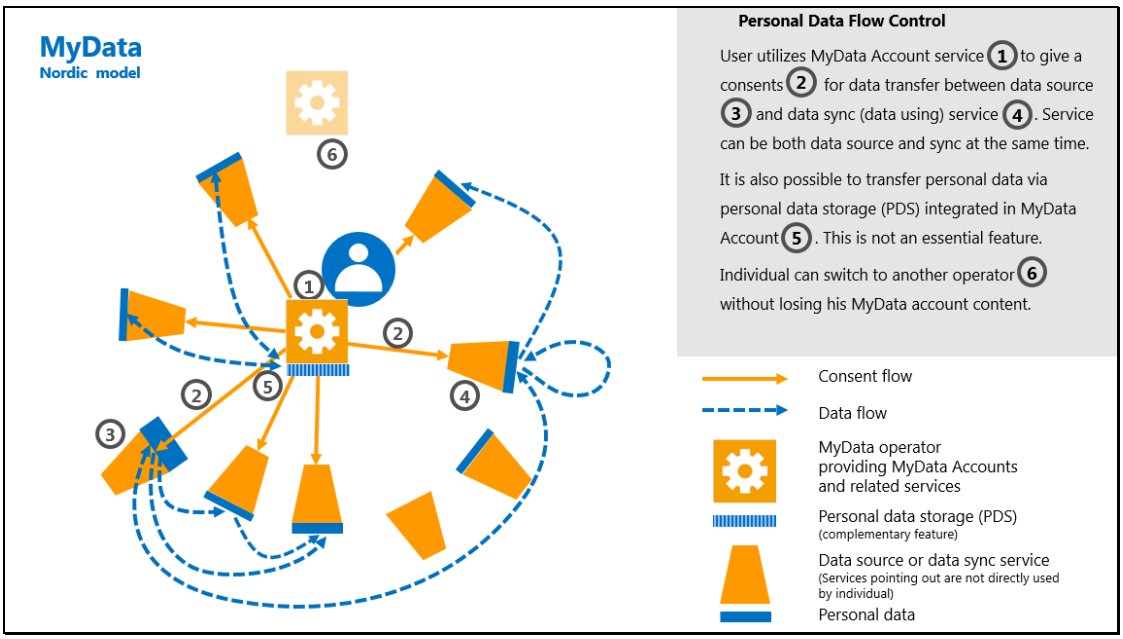

Figure 32 MyData Nordic model – interpretation of the model

One major deficiency of the MyData Nordic model (without PDS) is that it doesn't help in satisfying fundamental requirements individuals have towards PDE, which is to provide visibility on what data is collected, how it is combined and actually used, and for what purpose. Thus, it doesn't help in verifying the trustworthiness of organizations (and other PDE actors) by, for example verifying that they are dealing with personal data the way they have declared they would do. Ability to verify trustworthiness is fundamental for ensuring that trust is correctly placed, which is critical for strengthening trust in the whole PDE.

It is true that increased access to personal data would enable organizations to deliver more personalized services and to innovate. However, the success of the service utilizing personal data largely depends on the quality of the personal data used, its relevance, richness, accuracy, and freshness. Lacking visibility to personal data, MyData Nordic model offers no common mechanism to address those data quality aspects. Data quality would remain at the responsibility of the sources, and to some extent, users. The vicious cycle is not broken - poor data quality leads to deterioration of trust and vice versa.

What would then be the motivation for individuals to start using MyData Nordic account service in these circumstances? Control over unknown subject based only on declaration of its use cannot be meaningful, unless monetization becomes the key driver. Enabling data flow is

the prerequisite for monetization. As MyData Nordic operators would be competing in the context of personal data monetization, they would need to come up with innovative business models to achieve highest profitability of personal data and provide new services around it. Clearly, these would be motivational factors for individuals to change operators. If driven by monetization, while ignoring lack of visibility in actual data being transferred, the control of data flow can actually be harmful for individuals. Unintentionally, they would enable bad quality data and misuse of data to affect them negatively.

It is likely that after initial market saturation, only few global MyData Nordic operators would remain. They would probably be owned by those who currently dominate PDE like Google and FB, making them to grow even stronger. PDE based on MyData Nordic model would be soon pulled back to aggregator based PDE (Poikola 2014, 5) with an even more powerful few that are neither built nor operated for trust.

MyData Nordic model has emerged from a technical solution for enabling personal data flow and consent management. It has pragmatic, yet limited ambition. This short analysis has shown that the implementation of MyData Nordic model as such may encourage monetization of personal data while leaving some critical deficiencies of existing PDE unaddressed (e.g. lack of access to data and validation of data use). The expectation is that by enabling flow of data, there would be benefits for all actors. Yet, with limited ability to ensure data quality and verify its use, enabling free flow of data would introduce additional problems and risks limiting potential benefits. The race for monetization would result in further consolidation of power in the hands of a fewer big data controllers with unresolved trust issues, leaving PDE misbalanced and its potential unused.

The author of this thesis strongly believes that monetization of personal data is not the way for strengthening trust, which is the most critical enabler of balanced PDE. Although once thought otherwise, the conclusion is therefore that MyData Nordic model as such cannot be considered as a step towards MyData solution envisioned in this thesis. MyData has to be holistically thought, designed, implemented and operated for trust in all aspects.

7.2 Comparison of the Models

MyData and MyData Nordic models are compared using strategy canvas (Kim 2005). They are pictured together with existing PDE in Figure 33 using factors of competition described in Table 5. The comparison is based on the author's conceptual comparison of the proposed MyData concept and the earlier literature analysis on MyData Nordic Model. No empirical comparative study has been conducted.

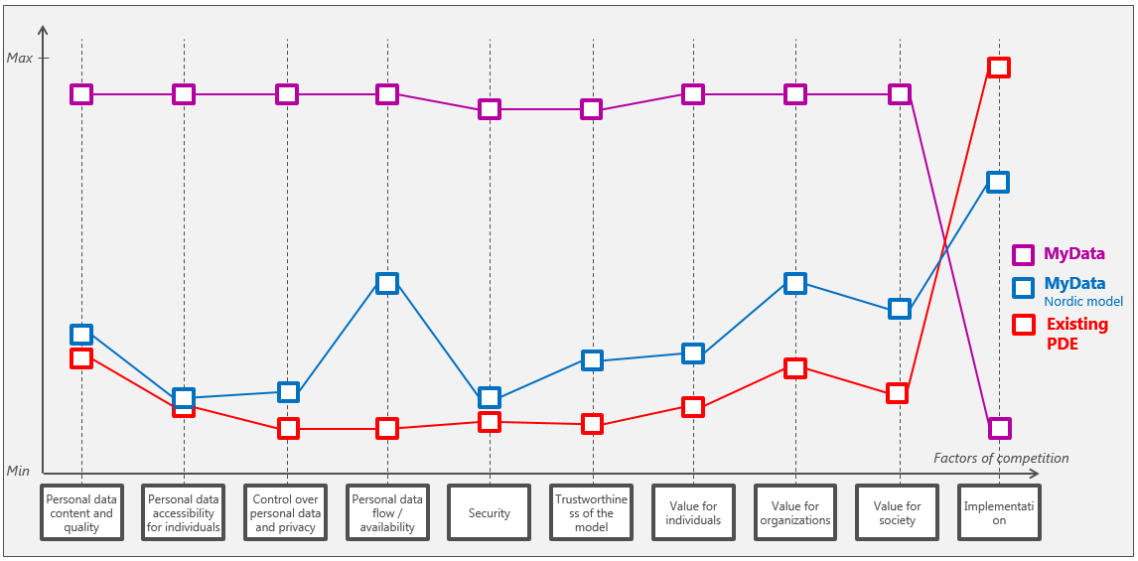

Figure 33 Strategy canvas – comparison of the models.

Factors of competition	Explanation
Personal data content and quality	Content and quality refer to correctness, completeness, and freshness of data.
Personal data accessibility for individuals	Accessibility refers to ability provided by the model to access own personal data, including volunteered, observed and derived.
Control over personal data and privacy	Control over personal data refers to ability to control appropriate use of data including ability to enable or restrict the access to personal data for certain use in a given context. Control over privacy is ability to control access to personal data categorized based on sensitiveness.
Personal data flow / availability	Ability to make personal data available by enabling data flow.
Security	Data security refers to confidentiality, availability, and integrity of data. It ensures that data is accurate and reliable and used only by authorized individuals or parties.
Trustworthiness of the model	Refers to ability of the model to improve trust in PDE.
Value for individuals	Refers to ability of the model to provide the value of personals data for individuals.
Value for organizations	Refers to ability of the model to provide the value of personals data for organizations.
Value for society	Refers to ability of the model to provide the value of personals data for society.
Implementation	How easy is to implement, i.e. inverse of complexity of implementation including required resources.

Table 5 Factors of competition for model comparison.

Designed for data flow, MyData Nordic significantly increases personal data flow and somewhat increases control over personal data. As a result, potential value increases for all the actors, the most for organizations and society. Accessibility to own data, its content and

quality will not improve much, if at all. MyData Nordic is much easier to implement and requires far less resources than MyData model.

Designed for trust, MyData model outlines the boundaries of a balanced PDE. It maximizes data content and quality, data flow and availability, and consequently balanced value for all actors. Security and trustworthiness are rated slightly under to acknowledge concerns expressed during workshops regarding the centralized nature of MyData in terms of content and the service itself. These aspects would continue being in focus during the implementation phase, which is out of the scope of this thesis.

8 Conclusions

8.1 Summary

The idea of MyData has originated from the author's preunderstanding and experience in dealing with sensitive personal data in a big global company, his human centricity in business development, and from his negative sentiment in relation to monetization of personal data. Aiming to make people owners of their own personal data, the idea was simple: before the service usage starts, obtain agreement from both parties, individual and organization, about the use of personal data, and then collect service usage data and store it centrally next to personal profiles. This would enable individuals to control their data and receive personalized services, and organization to utilize that data to learn about customers, improve their services, and innovate.

Realizing the wickedness of the problem of personal data ownership, and at the same time driven by the urge to validate the idea, initial discussions with experts and literature research were carried out. As a result, the problem was reframed as 'misbalanced PDE' and the goal was set to balance it, paving the way to achieving co-created value for each of the actors that is balanced with competing rights and risks of other actors. That is how the potential of personal data would start becoming exploited to its full extent. The big challenge ahead was to demonstrate that this solution is creating value for different actors which can be further balanced with competing rights and risks of other actors. Certainly, there was no practical way to measure the overall value co-created among all the interacting actors in the ecosystem.

Value Proposition Design was a logical tool of choice, as it is about the search for fit between customer's jobs, pains and gains and evolving offering that is addressing them. The goal was to come up with an improved service concept but not to go all the way to create it. Therefore, it was enough to pursue the problem-solution fit only. However, balancing PDE involves identifying problems and solutions and achieving problem-solution fit between all of the actors, including MyData as a hub. The complexity was reduced by out-scoping governments, so that the target became a 3-way problem-solution fit between individuals, MyData and organizations.

Entering the concept creation phase, workshops were planned to involve the desired mix of established companies and startups, which would be involved in testing the concept being evolved in search for fit. Yet each company had its own specific place in PDE and was concerned with their own set of issues. To aid discussions, the Value Network Map is used as a

tool to visualize roles carried by organizations and individuals and their interactions and data exchange. With each organization for the chosen characteristic set of issues, the value network map was drawn twice: first to describe the current situation, and then to visualize the possible future state using MyData (see examples in 1.29). Key jobs, pains and gains were mapped in both diagrams. Clearly, with MyData pains were turning to gains and new innovative ideas started popping up. The method worked, as the hypotheses have been tested and the evolving concept started moving towards the fit. It is fair to say that many more cycles involving more companies would be required to declare a problem-solution fit. But the main achievement is that this approach, as a way to achieve the fit, was positively tested.

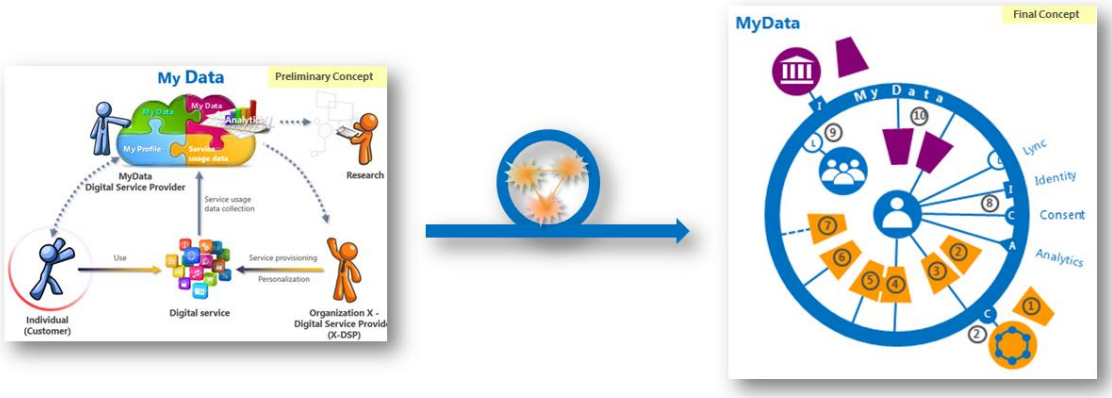

Figure 34: MyData concept evolution

The final version of the concept was outlined after the data from the workshops and interviews was collected and analyzed. Compared to the preliminary concept (Figure 34) the final concept has:

- established human centricity enabling people to search for true self,
3. strengthen trust providing transparency, control, identity for all the actors, and
4. provided enablers in a form of set of tools for engagement, innovation and value co-creation for all the actors.

Critiques of the concept have pointed out issues like security, “single point of failure”, and prevention of misuse. As pointed out, there are technologies available that can provide solutions, for example storage fragmentation and use of private keys for security, but those implementation details are not in the scope of the thesis.

The main concern by far is whether MyData would ultimately become “Big Brother”. The only way to prevent this is to design it for trust as well as to design it so that it would have benefits that outweigh these concerns.

8.2 Practical value of the research

The value of this research can be broken down to two parts. The first part is the value of MyData service as a principal solution for balancing PDE, which happens through balancing co-created value with competing rights and risks for all the actors. The second one is an effective research method developed for this thesis that is applicable for various purposes.

8.2.1 Value of MyData service

MyData service brings value for all the actors in the PDE.

This value for individuals includes, but not limited to understanding and managing their identity, obtaining visibility into data content and its use, applied analytics and algorithms; obtaining control over personal data and exercising ownership; having their voice heard; having the possibility to engage in co-design and co-creation of services; getting context sensitive personalized services; connecting with other people; getting organized around initiatives; replacing social networks; enabling communities of interest; utilizing personal analytics to understand their own and other people's behavior; and last but not least, governing MyData.

The value for organizations includes, but not limited to getting to know their current and potential customers; discovering people's unsatisfied needs and capturing their ideas; engaging individuals in continuous feedback and dialog around improvements and innovations; simplified, unified, compliant ways for handling personal data; alignment with applicable laws; risks sharing with MyData; engaging with third parties in providing innovative services; focusing on what matters to people and society.

The value for governments and the public sector includes, but not limited to focusing and modernizing related regulations; encouraging innovations; enabling various kinds of academic and commercial research; improving public services; and support for law enforcement.

The value for all the actors includes, but not limited to makes information becoming a shared asset; maintaining accurate, good quality, timely personal data; enabling shared ownership of data (observed and derived); enabling all the actors to manage their identities (universal identity); providing connectivity and engagement; maintaining relationships; making all the actors feel safe and trust each other; simplifying consent handling; and providing platforms for innovations.

Probably the biggest value of the concept is that it offers the vision of human centric PDE opening the views for exploring the staggering potential of personal data. It is not a fictive

construct, but a verified one to the extend appropriate for the purpose this thesis. This vision is intended to attract and mobilize people from all spheres of human activities to turn this concept into reality.

8.2.2 Value of the research method

Service Design Thinking process was followed through its first two phases, exploration and creation. During the creation phase, the concept of MyData service was being evolved towards a balanced PDE that enables co-created value balanced with competing rights and risks for all the actors. To carry that out, a unique combination of Value Proposition Design and Value Networks methods and tools was applied.

What appears as novel, based on the author's best knowledge, is the application of Value Networks in combination with elements of customer profiles and value maps from the Value Proposition Design process. The application starts with drawing a personal data flow diagram depicting "as-is" situations for selected business use cases, in addition to which jobs, pains and gains were mapped to pinpoint major pain areas and to focus the discussion. Then, a "to-be" diagram is redrawn to include MyData, and mapping is repeated to find out jobs that get fulfilled, gains that were achieved, and new pain points and opportunities that eventually appeared. Proofing itself as an important visualization tool in support of discussions about complex issues, this significantly helps to identify new ideas and solutions.

Furthermore, this study has demonstrated how the search for a 3-way problem-solution fit carried out, paving the way to applications of multi-way problem-solution fit.

8.3 Limitations of the research

The literature analysis included the Government as one of three key PDE actors. As an outcome of the literature analysis, the decision was made to exclude Government from the empirical study to reduce its complexity. Nevertheless, interviews and workshops with Privacy Officer touched upon some issues related to Government. One of the example cases discussed was about a government authority requesting consumer data without notifying the consumer. Government's pain points and needs uncovered through literature analysis were considered in the process of constructing the concept of MyData. Excluding them from the empirical study resulted in the inability to verify and improve MyData against those pains and needs. Consequently, use cases related to Government were not developed to become part of the concept.

The limited number of organizations involved in this research, especially the small number of start-ups, present another limitation. Even with a limited number of organizations findings

were indicative of existing pains and gains MyData would enable. However, the research would need to include more organizations so that more generalized conclusions could be drawn.

The search for a problem-solution fit is a long process, unlike the empirical study required for the thesis which is a time limited activity. It takes more time to search for fit as the complexity of the fit increases. Even with Government excluded, more cycles would have been be required to test the last concept of MyData presented as the "final" in the thesis. All pains, gains, and jobs from all the actors in consideration need to be addressed in the process and value proposition, concepted via use cases of MyData, enriched. A six-way problem-solution would require significant time and resources. For example, deletion of personal data requires balance between needs and risks from all of the actors. As a result, the claim that the problem-solution fit is achieved and PDE became balanced, cannot be made. A reasonable claim would be that the research has set the path and progressed on the way towards balanced PDE.

8.4 Suggestions for future research

Trust is at the heart of MyData. How to design, implement and operate MyData for trust remains still open. A new approach is needed in building a trusted 'organization' to deliver and evolve MyData service. This is a big design problem in itself.

The foundations of the concept could be strengthened by ensuring further justification from human, philosophical, technical, economic, and social perspectives. For example, more study is needed around allowing the deletion of personal data. It is also recommendable to explore other problems MyData appears to be addressing as well, and to find out opportunities for further development of MyData.

The concept should also be validated further by engaging more startups and especially experts who have already been involved in initiatives that are addressing issues around personal data.

The analysis of PDE based on MyData should be continued. This would include studying how multi-way problem-solution fit can be effectively obtained. Specifically, search for a six-way problem-solution fit would be exercised by involving government.

Value co-creation in MyData based PDE should be further studied in the context of value networks. The potential of personal data should be re-assessed and impediments that remain identified.

New technologies like blockchain should be explored and adopted for implementing various elements of MyData including decentralized and transparent governance, identity management, distributed data storage and data management, crowdfunding and crowdsourcing of MyData.

Creative ideas related to further utilization of MyData should be encouraged. These could, for example, include design tools to support innovations, co-design and the improvement of services.

And finally, MyData concept is to be opened for the public to attract capable, likeminded people, to take if forward towards trusted implementation and operation.

9 Postface

One day ahead of press, on 16th March 2018, Facebook informed the public about a data leak that has affected tens of millions of users and announced that they were suspending the company responsible for exploring the leak, Cambridge Analytica, from using their services. The New York Times article from 17th March 2018 (Rosenberg 2018) explains how Cambridge Analytica had collected personal data from 50 million Facebook users and used them to develop techniques for steering a big part of the US electorate toward electing the future president Trump. The final number of affected users by Facebook data breach has risen to 87 million (Romm 2018).

As a result, Facebook's privacy practices have come under scrutiny. Mark Zuckerberg, founder and CEO of Facebook, was called to testify in Congress. Despite Zuckerberg's apologies and promises, law makers were not convinced in the ability of Facebook to fix privacy issues and threatened to impose regulation on Facebook and other companies in the industry, reported by Romm (2018) from Washington Post. Executives from other tech companies, like Google, may be called to testify as well (Harwell 2018).

Momentum is gathering behind #DeleteFacebook movement. One of the most prominent figures who joined #DeleteFacebook movement was Brian Acton, co-founder of WhatsApp which was sold to Facebook in 2014 for $19 billion. Guides how to permanently delete Facebook account are being published. (Solon 2018.)

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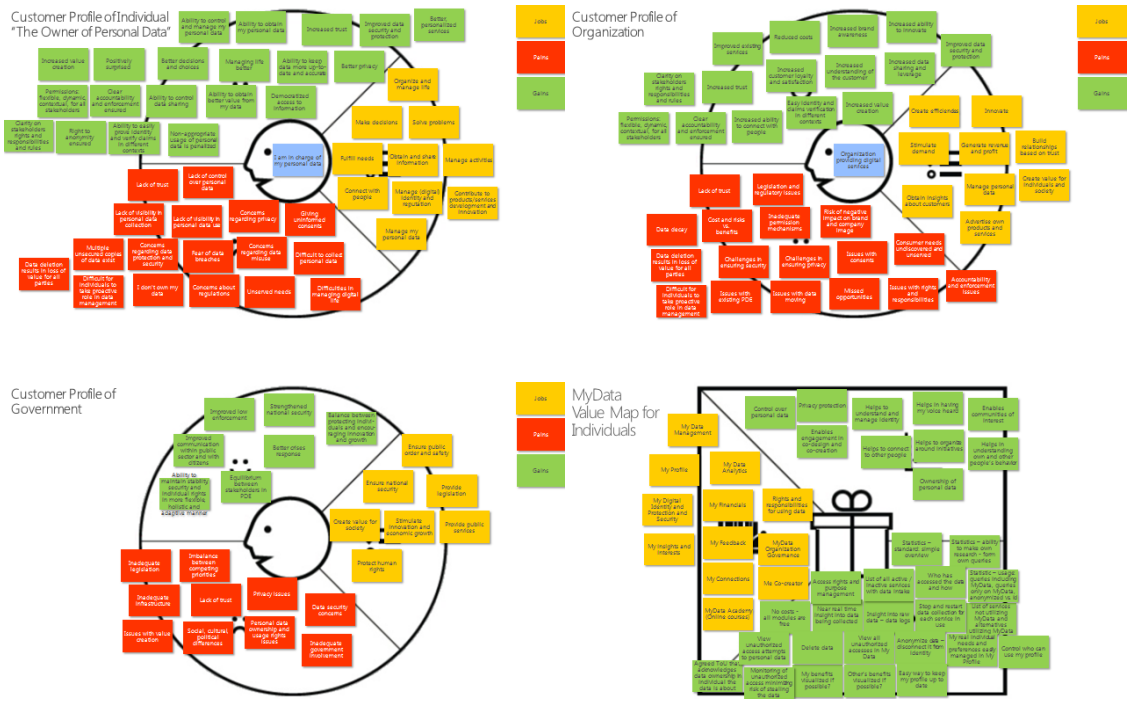
Figures

Tables

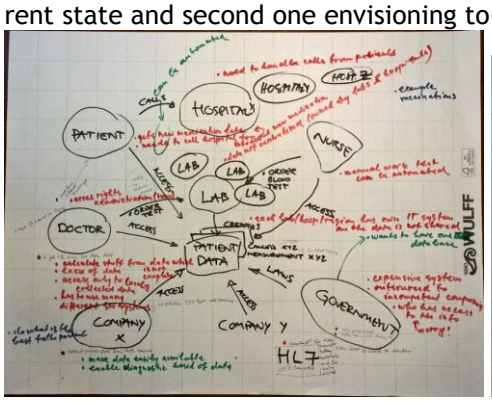
Appendices

Appendix 1. Examples of customer profiles and value map

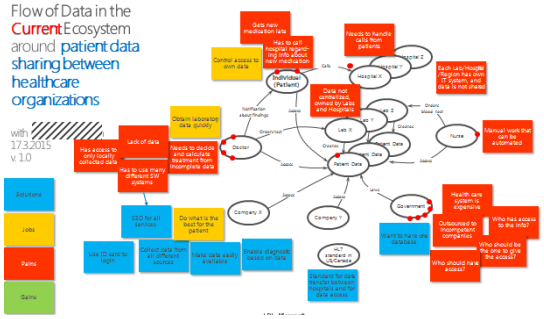


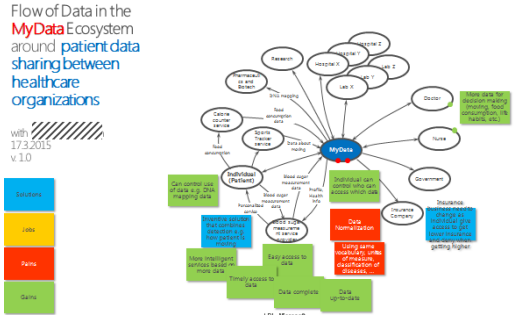
Appendix 2. Examples of data flow diagrams in MyData based PDE

Pairs of diagrams were manually co-created during workshops, first one always depicting current state and second one envisioning to-be state based on MyData.



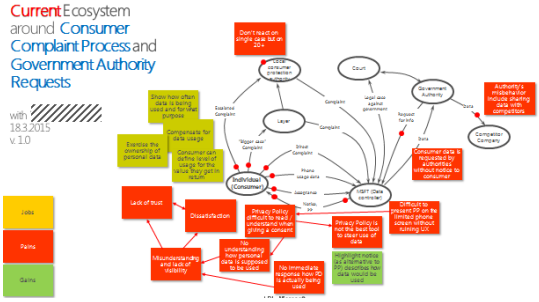
During post-workshop analysis, diagrams were re-created in digital form, having key jobs, pains, gains, ideas/solutions mapped on both of them.





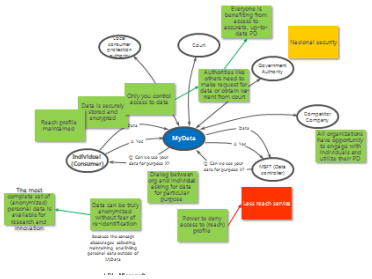
Flow of Data in the **Current** Ecosystem around **Consumer Complaint Process** and **Government Authority Requests**

with 18.3.2015 v. 1.0



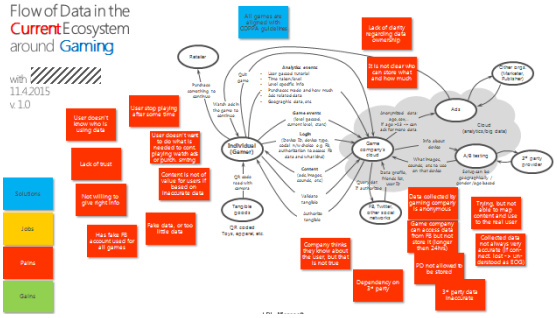
Flow of Data in the **MyData** Ecosystem around **Consumer Complaint Process** and **Government Authority Requests**

with 18.3.2015 v. 1.0



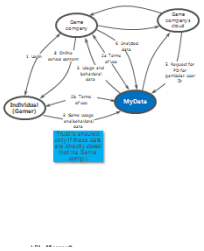
Flow of Data in the **Current** Ecosystem around **Gaming**

with 11.4.2015 v. 1.0



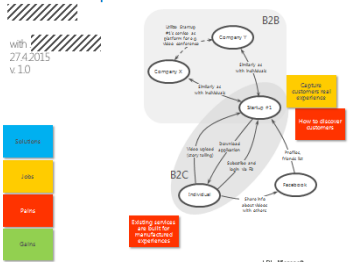
Flow of Data in the **MyData** Ecosystem around **Gaming**

with 11.4.2015 v. 1.0



Flow of Data in the **Current** Ecosystem around **Startup #1 -**

with 27.4.2015 v. 1.0



Startup #1 -

Industry: mobile

Founded: 2013

Product: real time video editing application + storage service + ?

Tagline: "We are changing how group photos are taken"

Customers:

- B2C: E.g. parents helping kids to take videos, store them and share
- B2B. Use similar for business purposes. E.g. real time edited background of rolling video shows some concept that is being discussed. Augmented reality?

Competitors: Vimeo, Evernote

Contact:

Discussion: not recorded

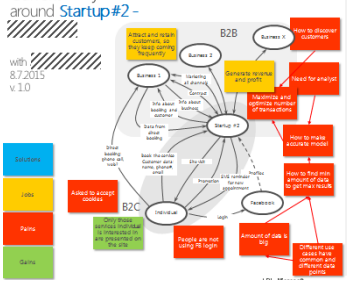
- "MyData is philosophy."
- "Why would I go to MyData to look for people's profiles? It doesn't exist. Better go to FB."
- "There are many attempts to do the same" or "it was done many times before"

Learnings:

- Discussion with startups may require different approach. E.g. **present MyData as platform**. And ask to imagine how they would benefit.
- It was understood more like that I was selling something, rather then attempt to **co-create** something.
- It is important to make understood that **this not a business**. Build **trust**.
- Challenge: reluctance to open up.
- Unlikely that recording would be accepted.

Flow of Data in the **Current** Ecosystem around **Startup #2 -**

with 8.7.2015 v. 1.0



Startup #2 -

Industry: software, web

Founded: 2011

Product: Appointments booking site and marketing platform for small businesses (hairdressers, manicures, etc.).

Customers:

- Small, local businesses
- Individuals

Business model:

- Transaction fee

Competitors:

Contact:

-

Discussion: not recorded

- Individual's profile containing name, phone#, email is created for each transaction. Login system is not in place, but it will be in the future.
- Login via FB account implemented but not in use. Not interested for full FB profile, only small part.
- Businesses don't ask for more customer data, they are only interested that customers keep coming every day.
- Hakema sends service reminder via SMS to customers to schedule new appointment – e.g. 6 weeks after last haircut for men.
- People are asked to accept cookies. Those are used for tracking (e.g. site browsing) -> indicating interests. Behavioral data for each profile exists: how often is certain service taken, site accessed, browsing path, etc.
- When customer come to the site, they are identified and only services they are interested in are shown.

cont. on the next page ->

Flow of Data in the **Current** Ecosystem around **Startup #2 -**

with 8.7.2015 v. 1.0

Startup #1 -

Discussion:

- Targeted advertising: if one visited beauty site, she will get ads in here later browsing (via Google etc.). Click through will be collected and analyzed. Based on ads trading, decision is made whether to show ads e.g. 3 or 6 times, or to stop showing them.
- Will go eventually for introducing Login. FB login is already enabled, but people are not using it. This finding is result of testing. FB don't allow data to be copied, only accessed.

Learnings:

- Startups don't want to reveal their business in sufficient level of details.
- Consider (personal) data as blood of their business. Have a strong ownership feeling. Would never accept data to be collected elsewhere. They don't trust to any external party to hold the data. They must keep it themselves. Businesses have a right to change the data but they say Hakema owns it. They also say they own individual customer data.
- Not aware of problems of misbalanced PDES, therefore don't understand full value of the solution.
- The solution doesn't exist anyway. They need something concrete and they need it now. They need practical, not academic solutions. That is why is difficult for them to discuss it at conceptual level.
- Would rather go for existing FB, Google, etc. solutions (access to people's profiles), because they exist and they are good enough.

Conclusion: proposed solution would not help them.

Problem is too much data. Only one smaller part of it is interested. They believe that good analytics is the solution.

- It's OK to push to 30% or customers wrong advertising, because their interests are not discovered reliably (but based on site browsing). "If people don't like it they should ignore it. Anyway observing this % is good learning for the company."
- These are outdated practices that treat customers badly. It is cheep and successful due to lack of competition.
- Don't believe that is possible to achieve and sustain trust.
- It would take much more time to explain the issues and convince them.
- I have not yet found early adopters among startups.
- Established companies are much more mature when it comes to understanding ownership of data and related issues.

Trust is not absolute, but you can design it for trust, and be more trustworthy then any others. This is hopefully enough for this approach to work.